

# Great Basin Live Fuel Moisture Project

## End of the Year Summary

### 2005



## Great Basin Live Fuel Moisture Project Overview

2005

After six years of consecutive drought Nevada has finally received significant rainfall that has brought relief. Precipitation and snow pack over the six previous years were well below normal. Above average snow packs and rainfall during the fall and winter of 2004, as well as during the spring of 2005 provided this relief. Nevada was removed from drought status as a result of above average rainfall and snow accumulations. As of May the precipitation averages for Nevada were normal to well above normal. The percent of average for precipitation ranged from 95% to 249% across the state and averaged at 129%. Snow pack was also near average to well above average, ranging from 107% to 311% as of May 2004 across the state. Snow packs accumulations were reported as being the largest in the eastern portion of the state at 311%. The prevailing weather pattern across the great basin is not currently controlled by either the El- Niño (warm surface waters in the equatorial Pacific Ocean) or La- Niña (cold surface waters in the equatorial Pacific Ocean) effects. The weak El Niño that persisted into the winter of 2004 dissipated during 2005. West coast climatic conditions are currently observed as being in an El Niño Southern Oscillation (ENSO) – neutral condition in the tropical pacific. During the winter of 2004 Nevada received above average precipitation and experienced far cooler and wetter conditions than normal.

### 1. Contributing Factors



Record high temperatures and below normal winter snow packs across Nevada led to drought during the early portion of the summer of 2004. However, the amount of precipitation that Nevada received during the winter of 2004 was well above average. The end of the drought along with cool spring temperatures led to normal fuel conditions in Nevada in the late spring and early summer. The average fuel moistures observed during the early portion of the 2004 fire season set the stage for a normal fire season. The moist conditions decreased the chance of dangerous conditions such as high probabilities of ignition, high rate of spread, increased flame lengths, and high intensity fires to develop during the spring and early summer. Conditions that normally provide the potential of large intense fires are: the accumulation of fine fuels from the previous year's growth, low relative humidities, poor relative humidity recovery, low fuel moistures in both live and dead fuels, below average precipitation accumulations, and high temperatures. Most of these conditions were near normal during the 2005 season. The condition of most concern was the accumulation of fine fuels from previous years. As the summer progressed the monsoonal moisture pushed into the far southern portion of the state and brought with it several heavy precipitation events. Some far eastern areas of the state also received monsoonal moisture. The rest of the state was not

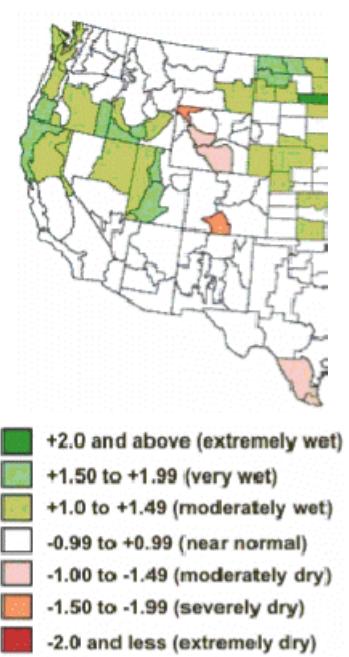
**Figure 1**

significantly affected by monsoonal moisture (**Figure 1**, U.S. Drought Monitor for August 2, 2005).

Normal to above normal precipitation during the spring was observed ranging from 95% to 134% in the Northern Great Basin. Well above average precipitation accumulations were observed in Southern Nevada (249%). Above average precipitation accumulations were also observed in Eastern (172%) and Western Nevada (107% - 139%). Early spring warm-up in May led to rapid snow melt, soil saturation, and flooding in western Nevada. While cool spring weather in June allowed the snow packs to melt more slowly and increase our depleted water reserves for the summer (**Figure 2**, Six month Standardized Precipitation Index for April 2005 through August 2005).

Live fuel moisture values began to decline at the end of May and through the middle of June this year, which is approximately normal. Temperatures that were slightly above average in May created conditions that allowed initial curing of the fine fuel component. April and June temperatures were cooler than normal, while July was slightly above normal. Wet soils and near average temperatures created approximately average live fuel moisture values. The 1000-hour dead fuel moistures at our Western Nevada sampling site were near average for most of the fire season. Live fuel moisture values were at critical levels from early to mid-July through August for most of Nevada.

The persistent drought that Nevada experienced over the previous six years heavily influenced the mortality in both shrubs and trees. The drought caused an increase in plant stress, which consequently decreased their ability to resist disease and insect attack. Extensive sagebrush mortality has been observed throughout Nevada over the past few years. Plant stress resulting from the past drought also increased the vulnerability of sagebrush to moth infestation. The moths that have been attacking the sagebrush are defoliators, which prefer the consumption of sagebrush over other shrubs. The populations of these types of moths are controlled by natural conditions, such as high temperatures and drought. In addition to increases in sagebrush mortality, increased pinyon and juniper mortality was also observed across Nevada, which was also closely connected to the drought. Trees are often able to survive short droughts that last a few years. The duration and intensity of the past drought stressed many trees beyond their point of recovery. Pinyon trees are more susceptible to insect and disease when they are stressed for prolonged periods. In eastern Nevada drought stressed pinyon trees became infested with scale and mistletoe, which increased the number of tree deaths observed. Increases in the abundance of dead trees initially increase the chance of ignitions and more intense fire behavior. However, after dead trees lose their needles the continuity of the crowns is reduced. Once crown continuity decreases it reduces the probability of fires becoming intense crown fires, although increased fuel loadings on the ground will lead to more intense ground fires. Residual fuel loadings that accumulated throughout the drought present concern, due to their potential influence on fire intensity.



**Figure 2**

During the 2005 fire season slightly above average temperatures were observed in most portions of Nevada, with the exception of June and September, when temperatures were slightly below normal across the state. The temperatures with the highest departure from normal were observed in July.

In contrast to last summer, precipitation accumulations this past fire season were near normal for the duration of the summer. The moderate to extreme drought that was experienced through the middle of last summer came to an end due to heavy precipitation during the winter. Relative humidity values were above normal during June as a result of low temperatures. During July and August relative humidity values decreased and temperatures increased, due to minimal monsoonal moisture throughout most of the state.

The 2005 fire season terminated earlier in the fall than the 2004 fire season. This year's fire season ended in mid-September, while last year's fire season ended in early October. Cool temperatures and significant precipitation accumulations brought the early termination to the fire season.

## **2. Great Basin Live Fuel Moisture Statistics**

The sampling sites for this field season included: Nevada, California, Idaho, and Oregon (Utah's live fuel moisture values are posted on the web at: <http://www.blm.gov/utah/moab/fire/rx.html>). The various agencies that participate in the project are the Bureau of Land Management, U.S. Forest Service, and California Division of Forestry. The Great Basin Live Fuel Moisture Project continues to be available on the Internet at [www.nv.blm.gov/fuels/GBLFMP.html](http://www.nv.blm.gov/fuels/GBLFMP.html).

Graphs on the subsequent pages show the live fuel moisture values for the 2005 sampling season, which began in late March and ended in late October. The 2004 and 2005 biweekly sampling data as well as the average line data are also displayed on the graphs. The average line is based on more than three years of data. Most of the sampling sites have been in existence for more than twelve years and some of the sites have existed for as long as 22 years.

## **3. Thousand Hour Time Lag Fuel Statistics**

The thousand hour time lag fuel graphs depict the moisture trapped within fuels that range between 3 to eight inches in diameter. Any peaks in the graphs represent significant precipitation events that lasted several days. The graphs in this report depict values that fluctuated between above and below average for the fire season. The above average values occurred in western Nevada up until July. Below average values were observed from July through September across the state. These fluctuations resulted from precipitation deficits and higher temperatures later the summer.

## **4. Pinyon Pine Fuel Statistics**

This was the ninth year for the Pinyon Pine fuel moisture report. The graphs show pinyon live fuel moisture values below average from April through late July and mid-August. The live fuel moisture values peaked, and were above average beginning in late-July and into early

September. Fuel moisture values began to decline at the end of August and beginning of September after new growth had ceased.

## **5. Missed Sampling Periods**

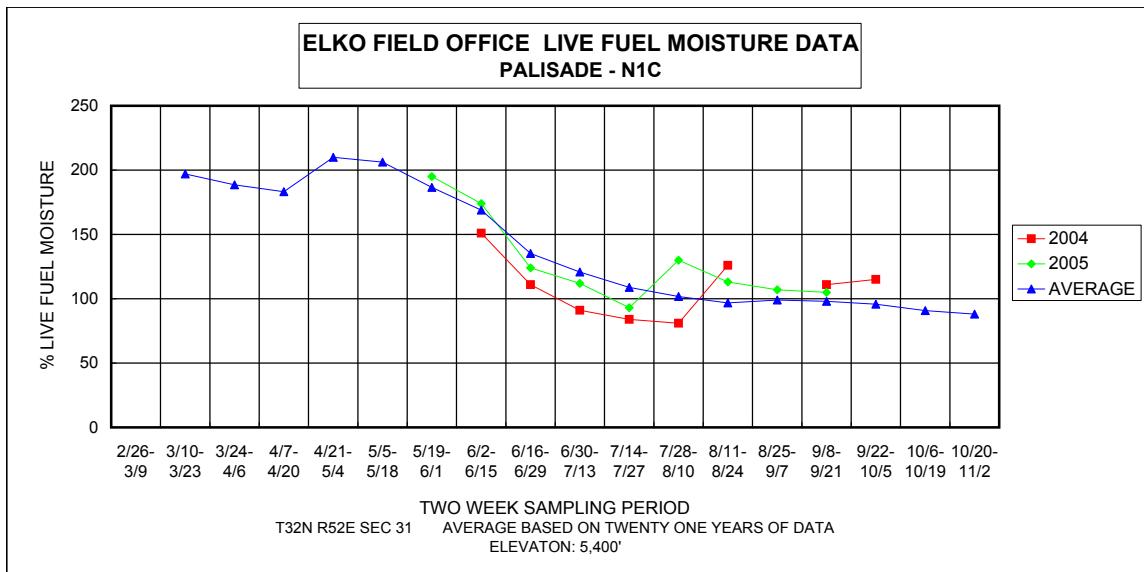
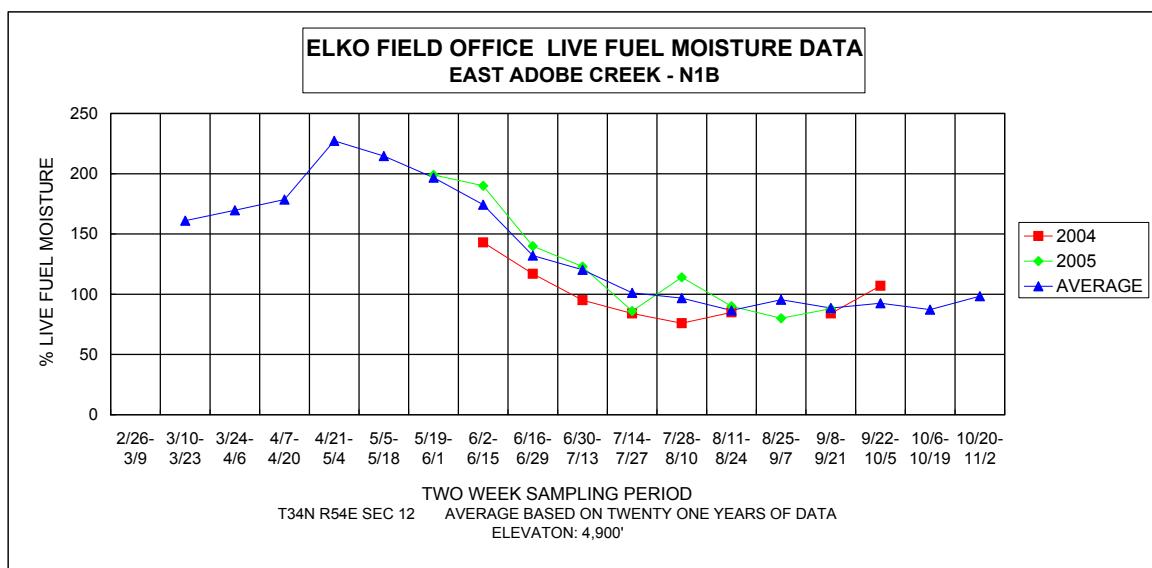
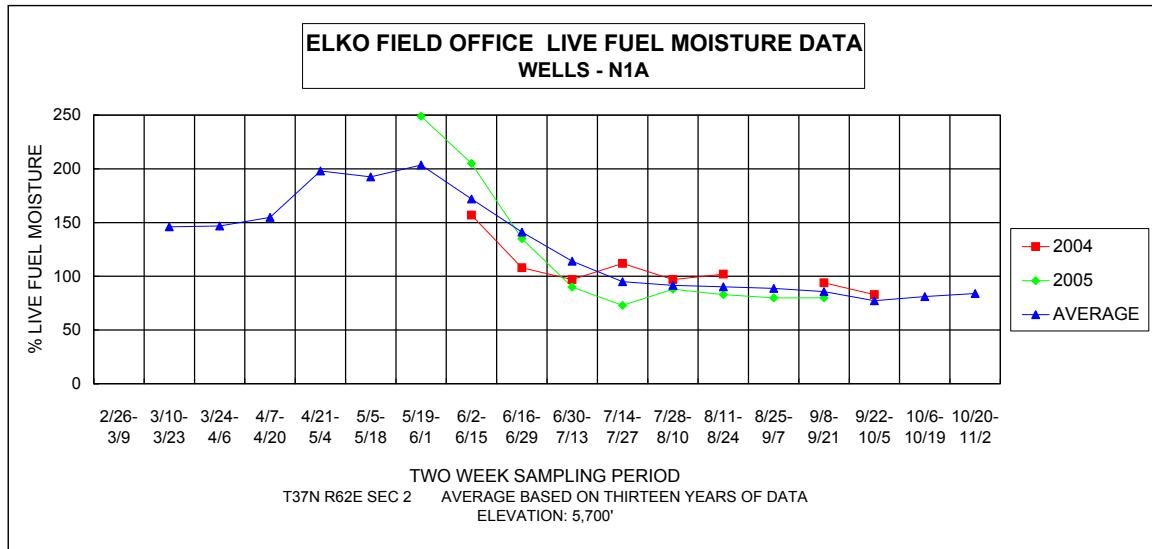
This report shows how many sample periods were missed during the field season. There are breaks in the graphs that show the actual sampling periods that were missed.

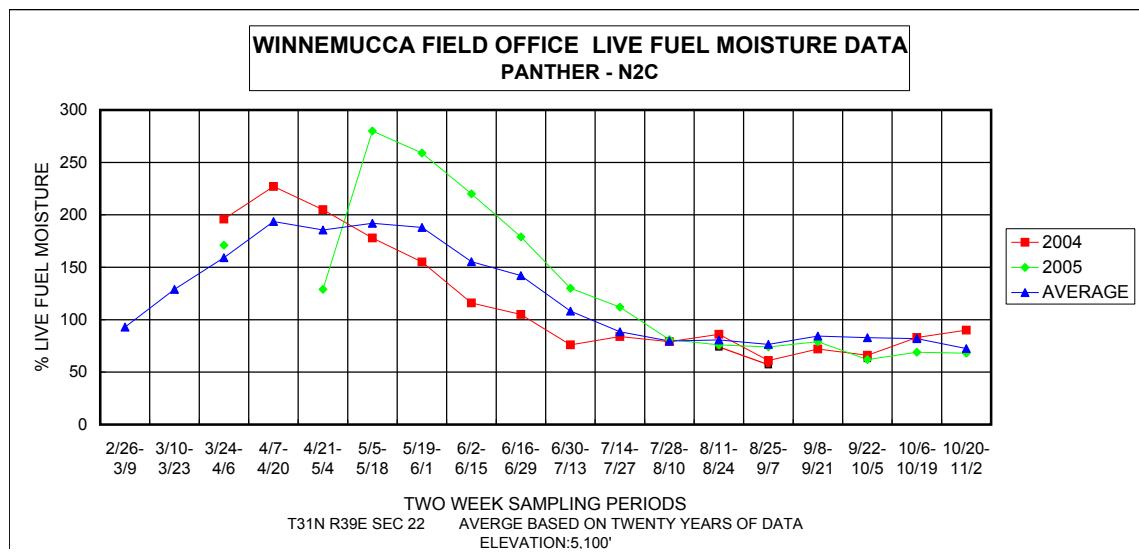
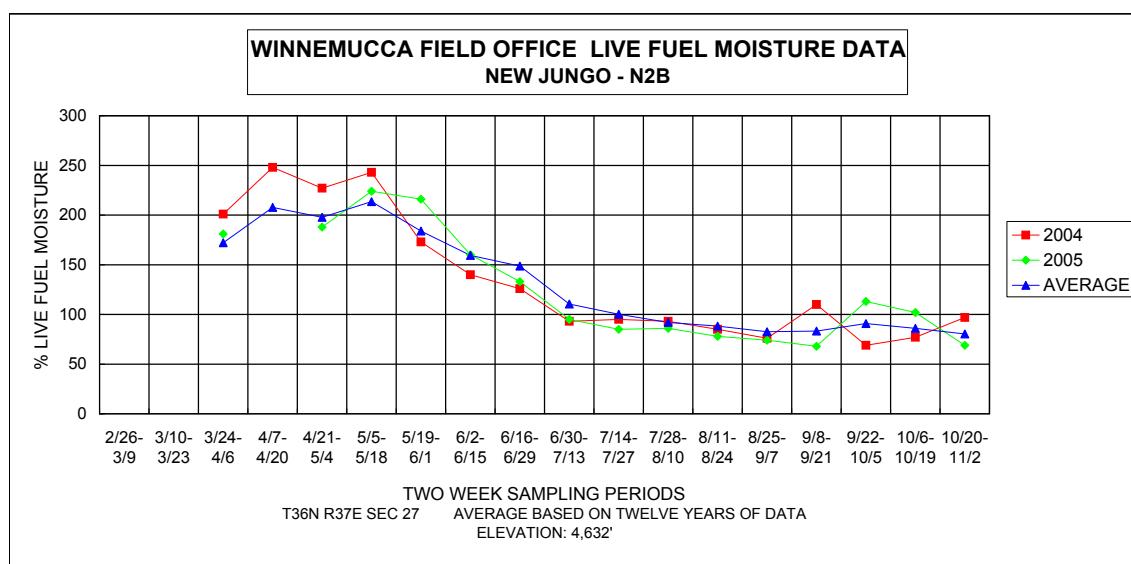
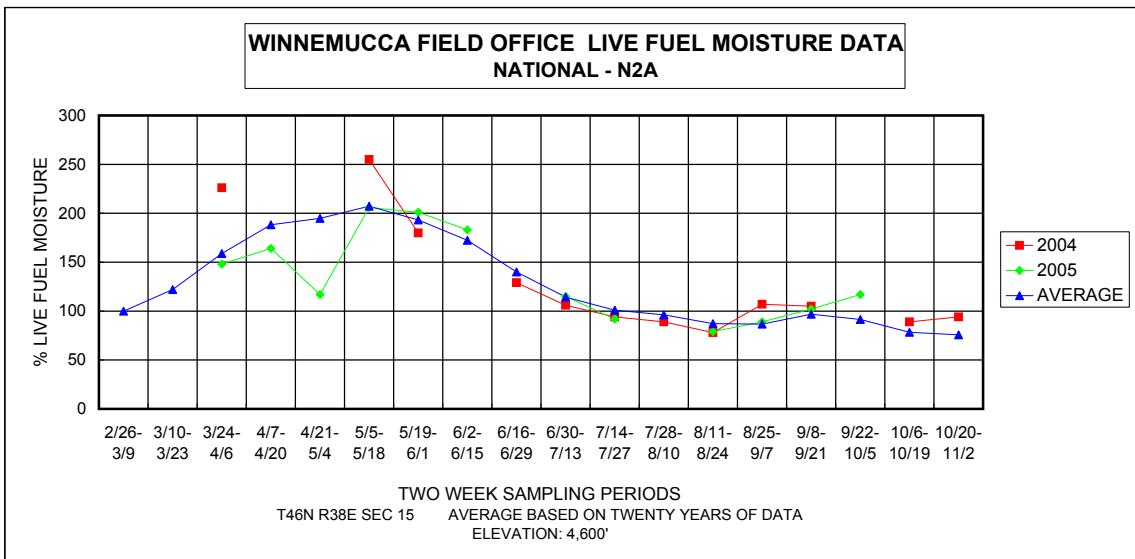
## **6. Precipitation Totals**

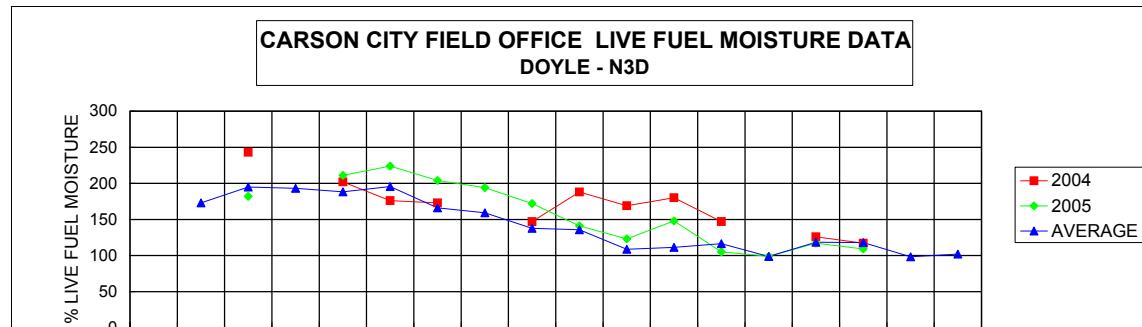
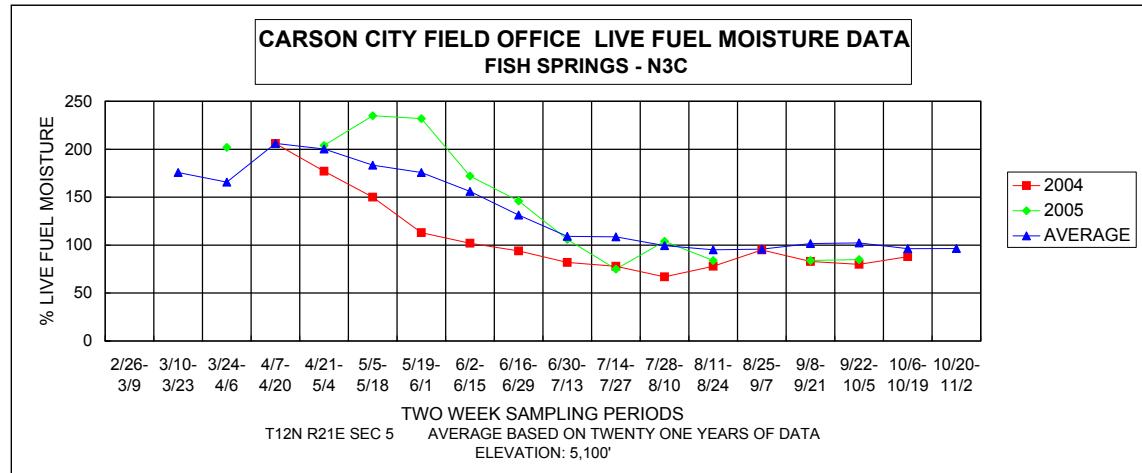
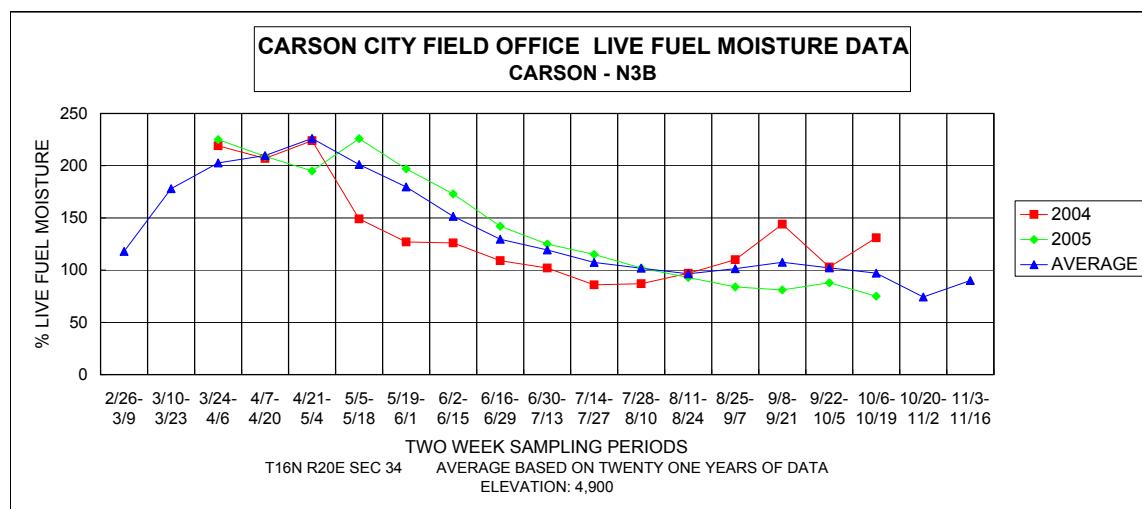
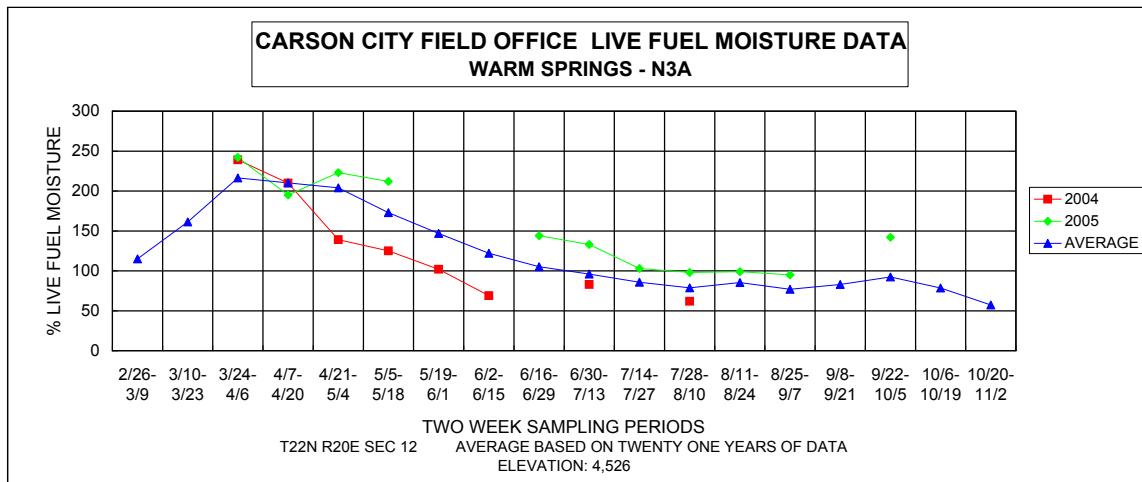
These graphs depict the precipitation amounts from the Automatic Raws (RAWS) throughout the state.

## **7. Fire Danger Rating Graphs (Burning Indices)**

This section shows the representative burning indices or energy release components for representative RAWS stations.

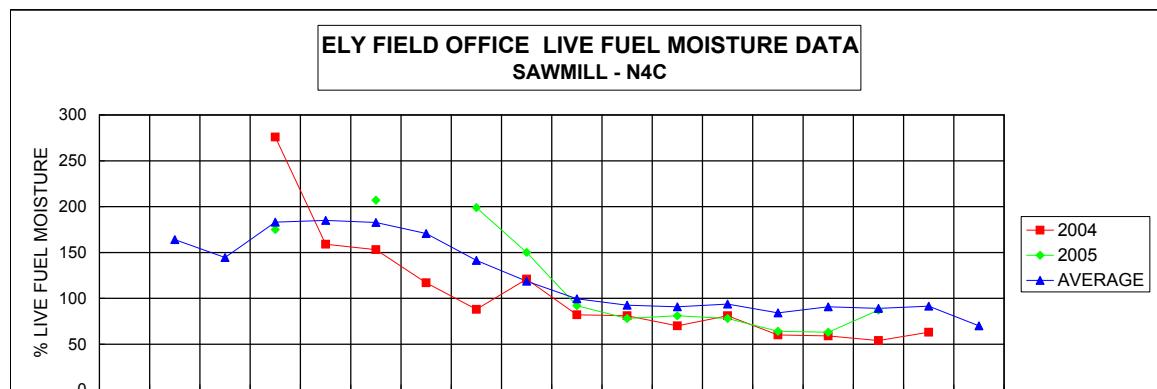
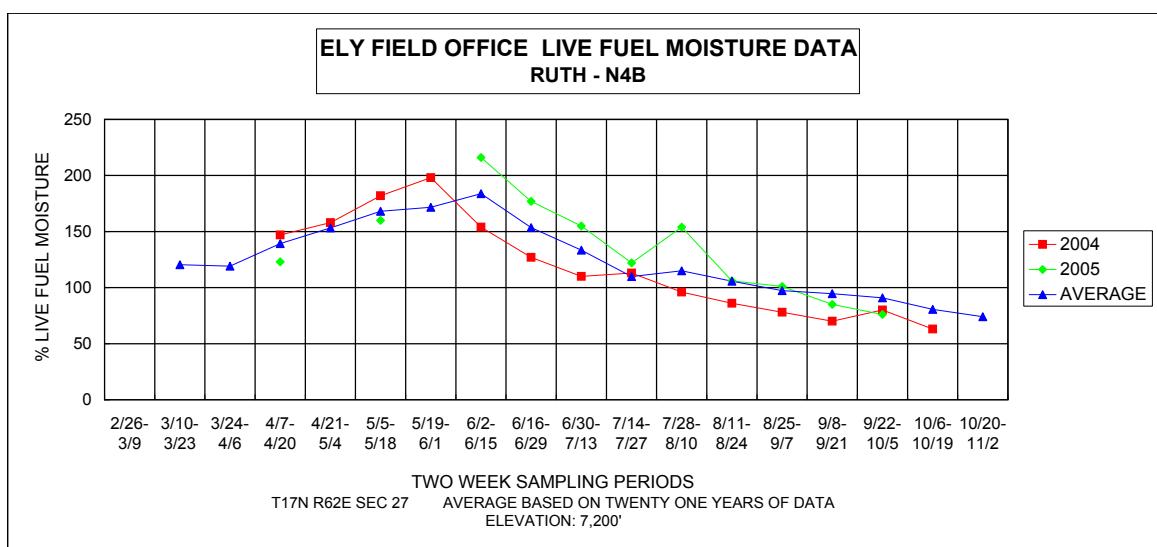
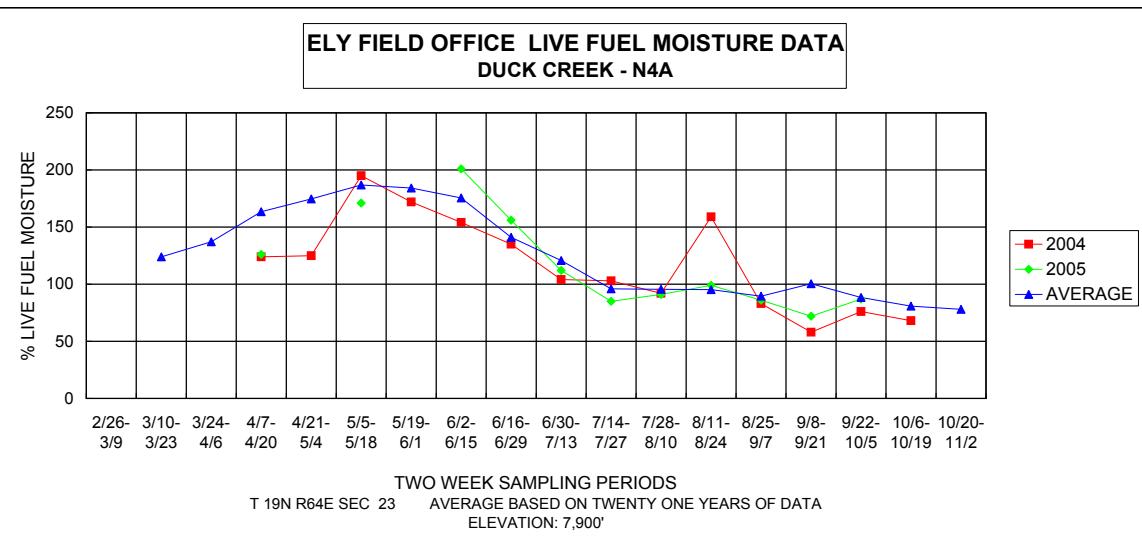


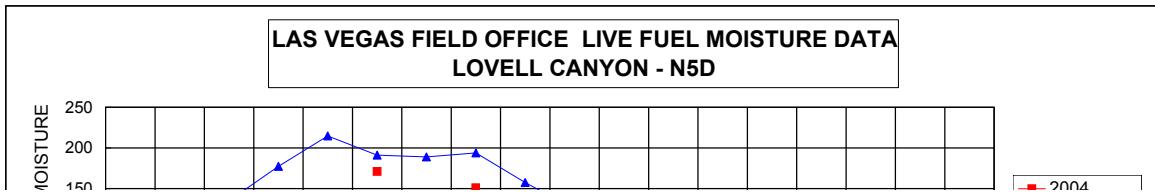
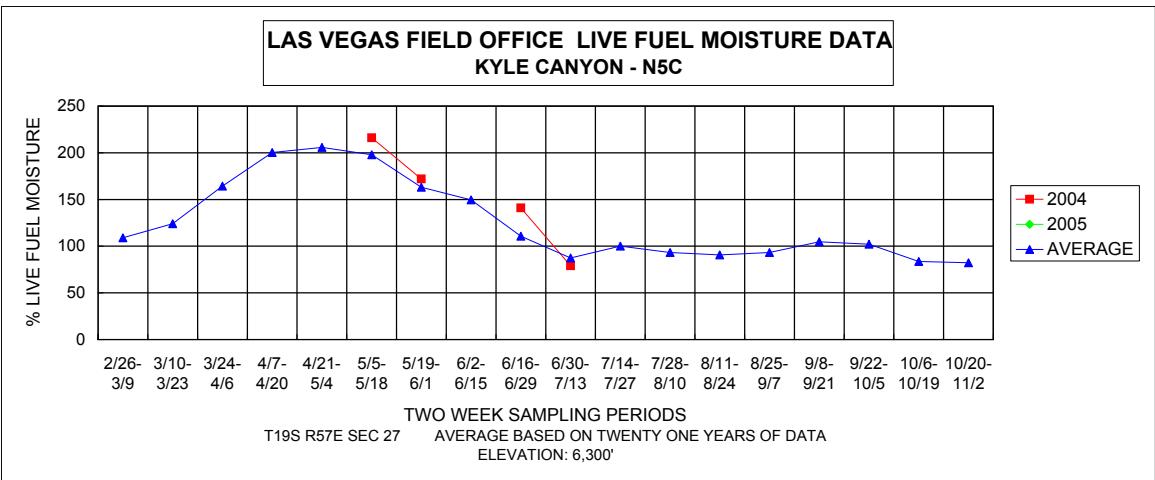
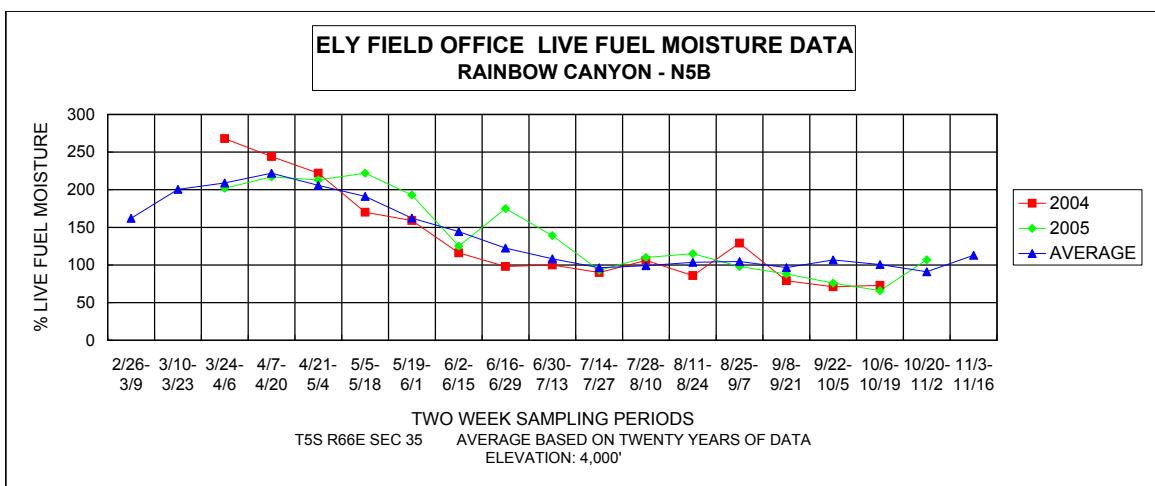
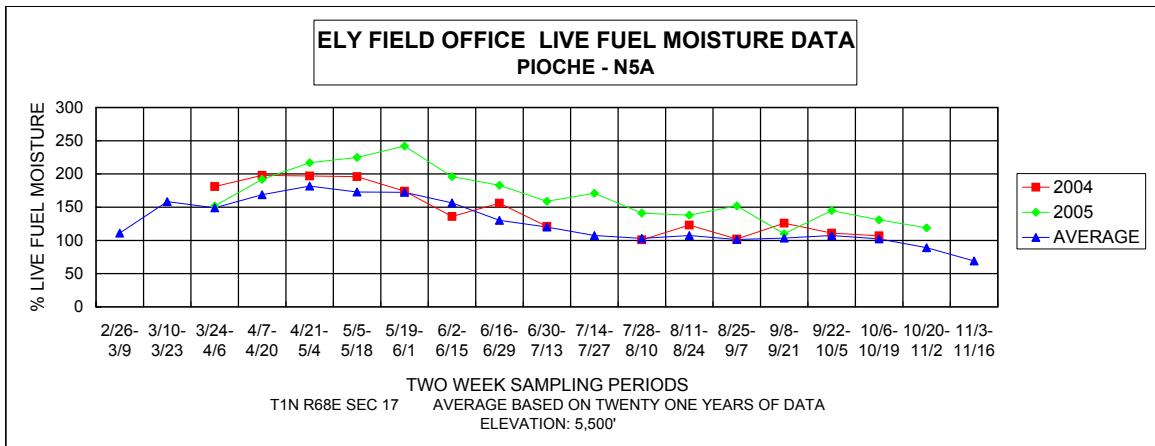
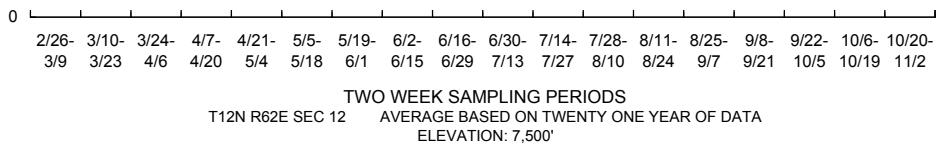


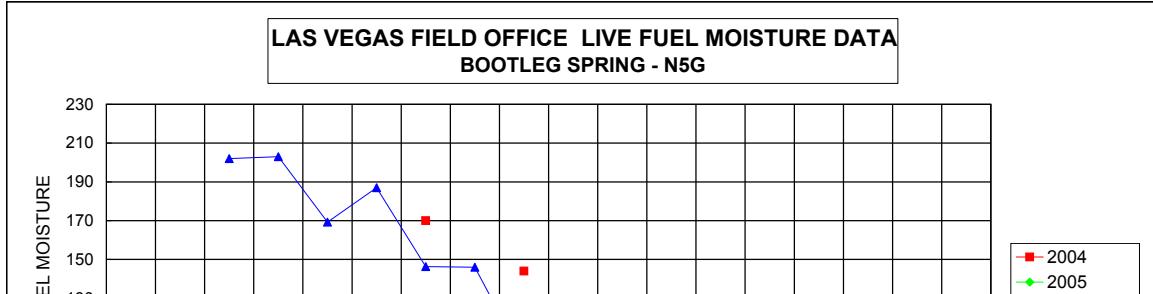
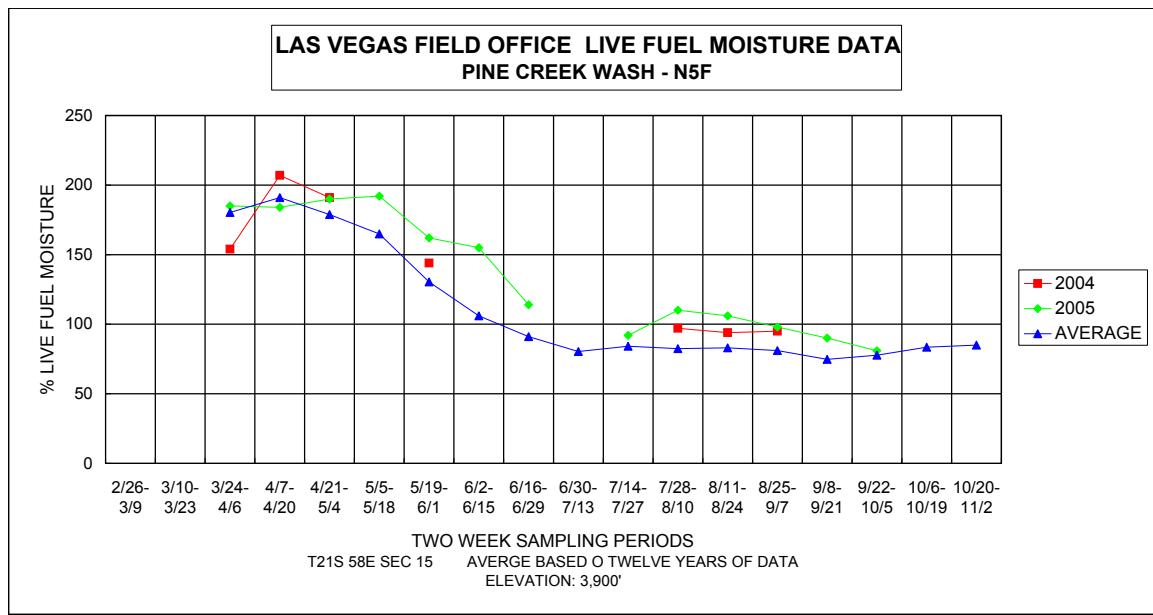
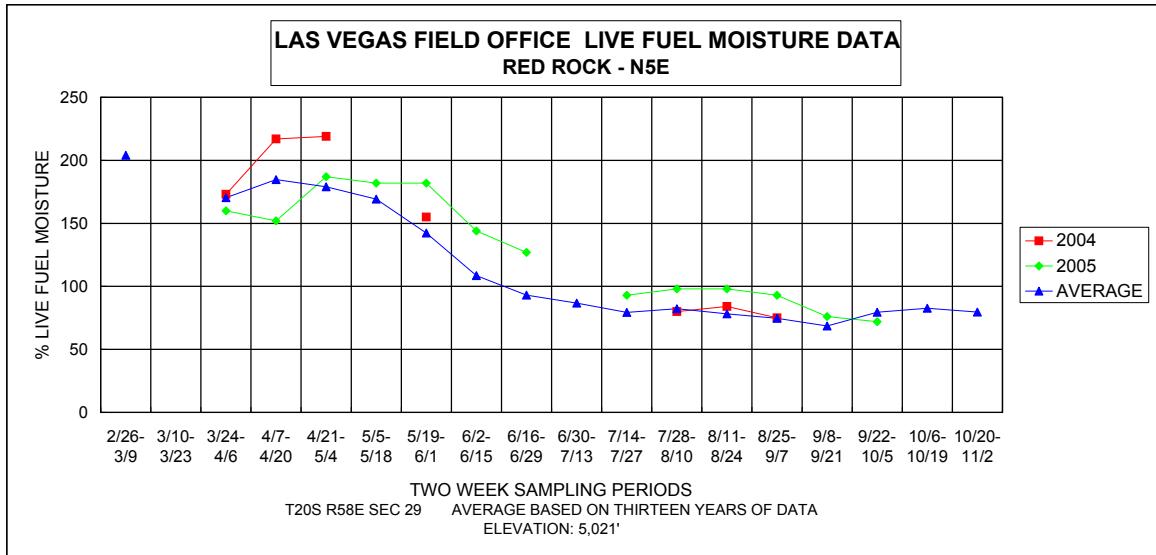
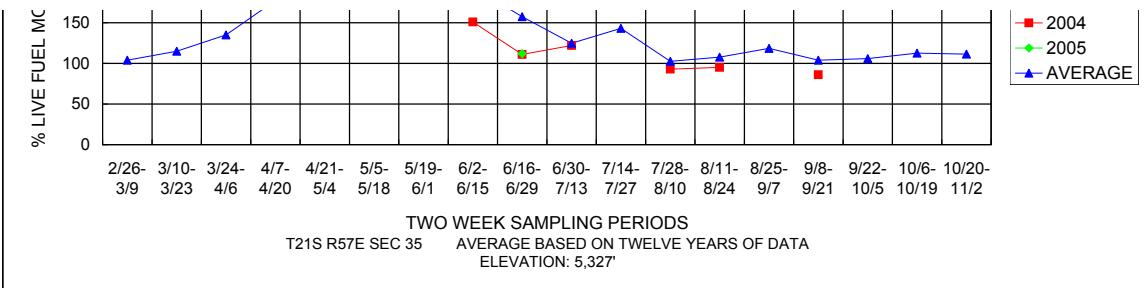


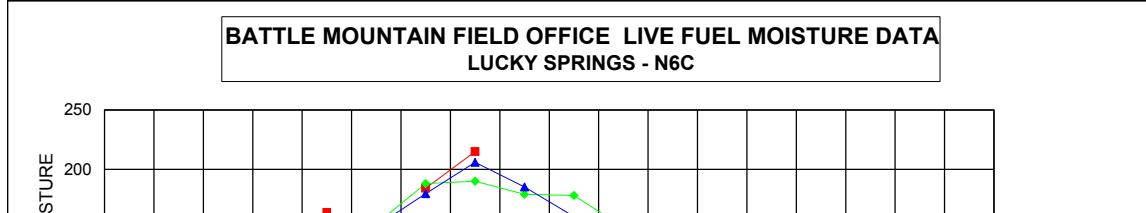
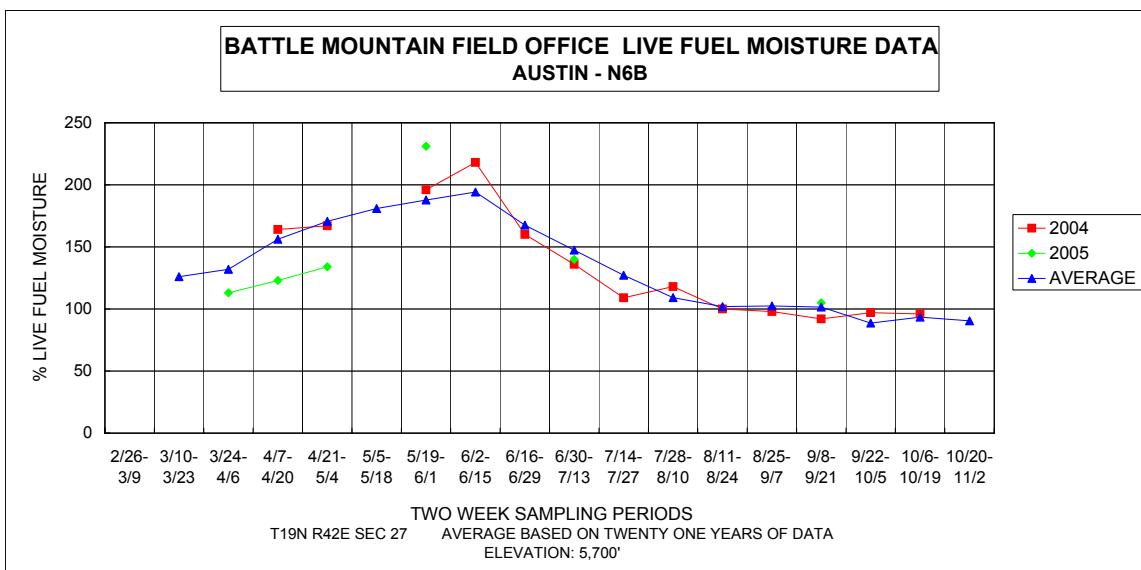
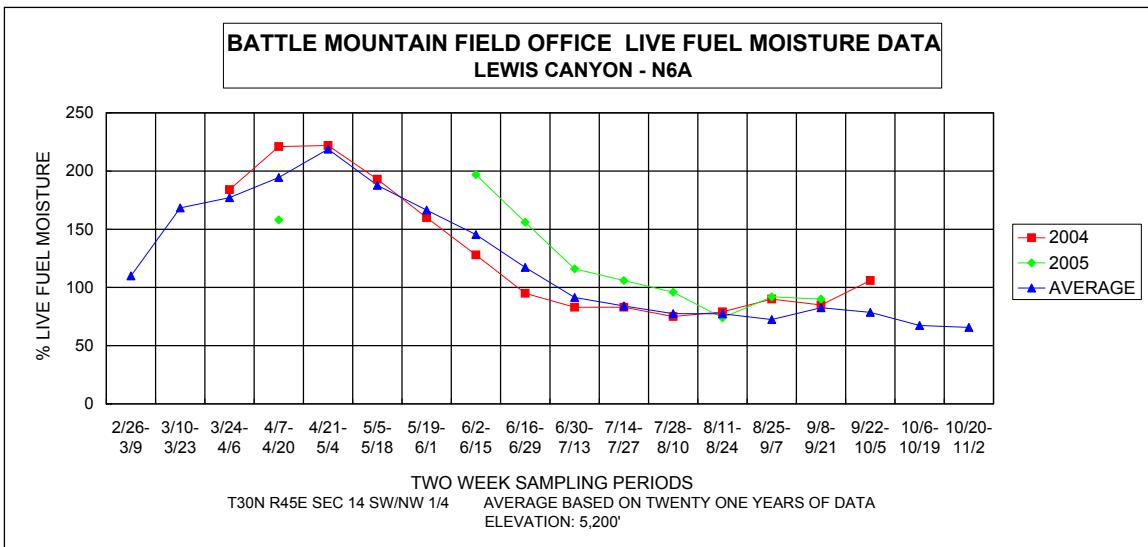
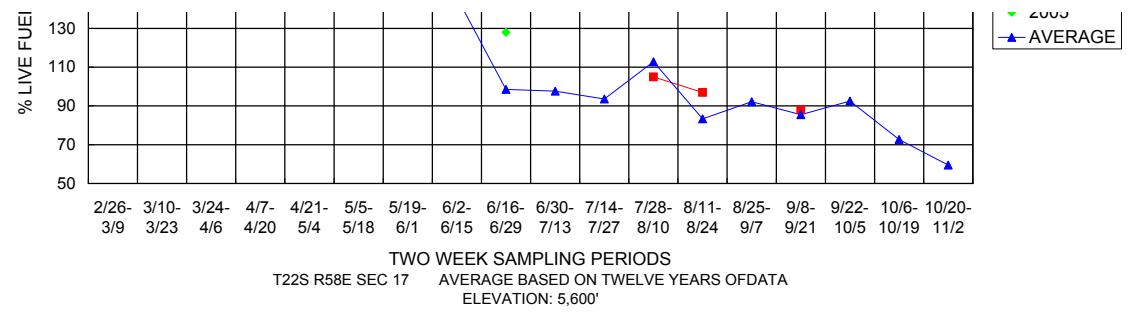
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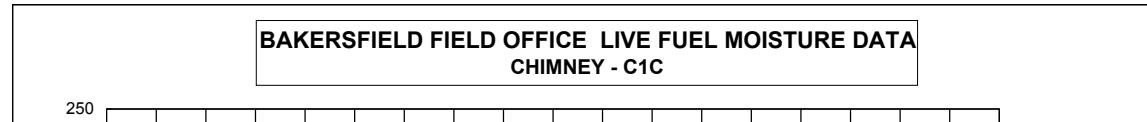
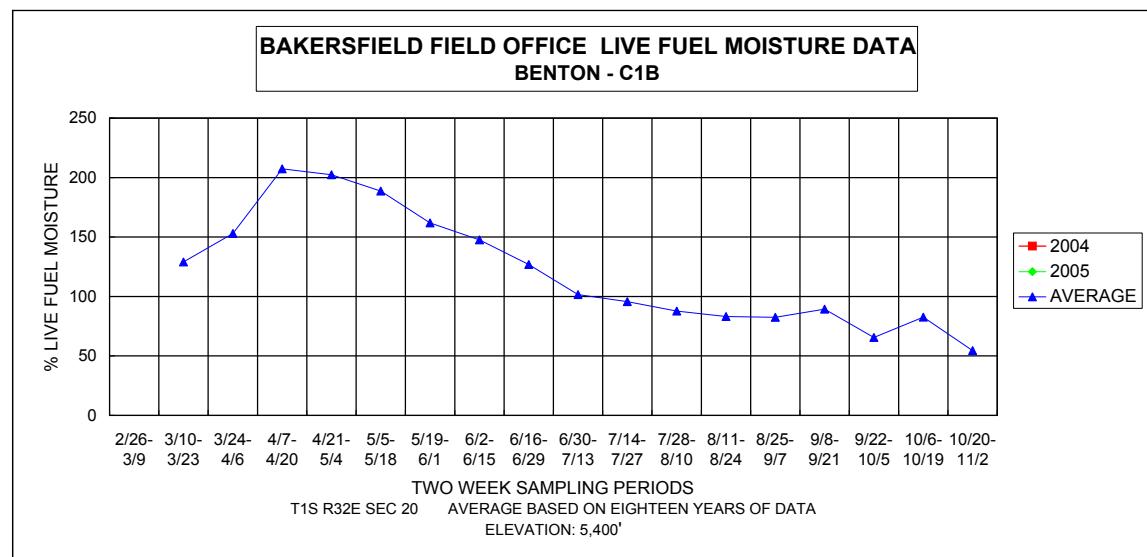
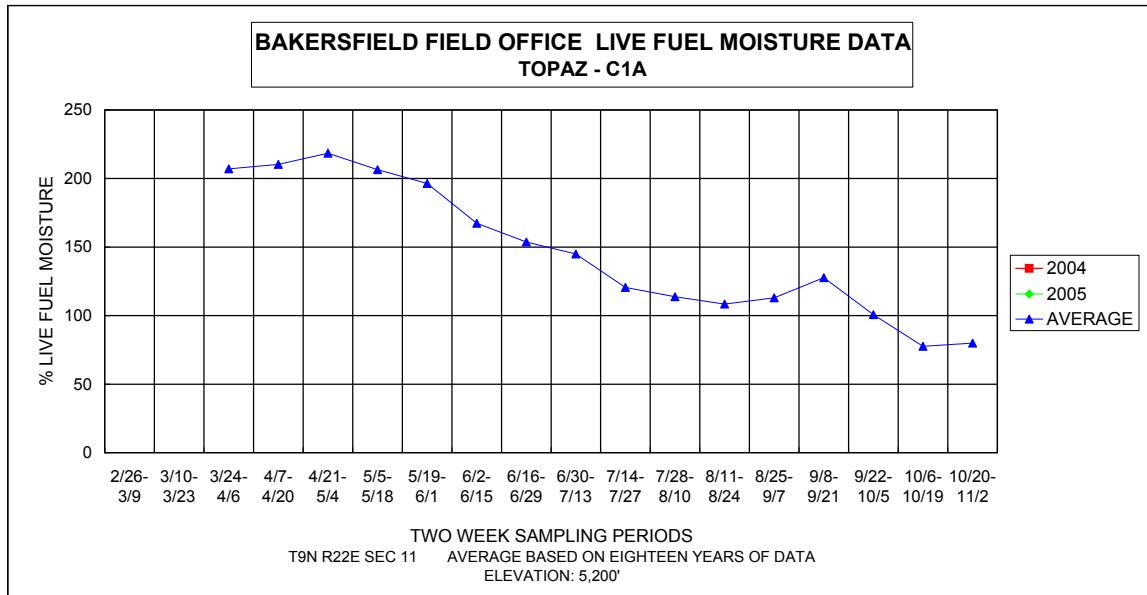
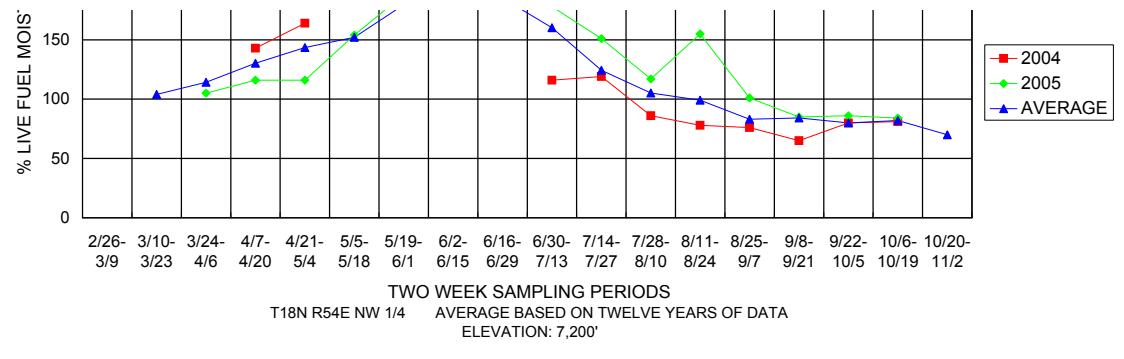
TWO WEEK SAMPLING PERIODS  
T25N R17E SEC 1 AVERAGE BASED ON FOURTEEN YEARS OF DATA  
ELEVATION: 4,500'

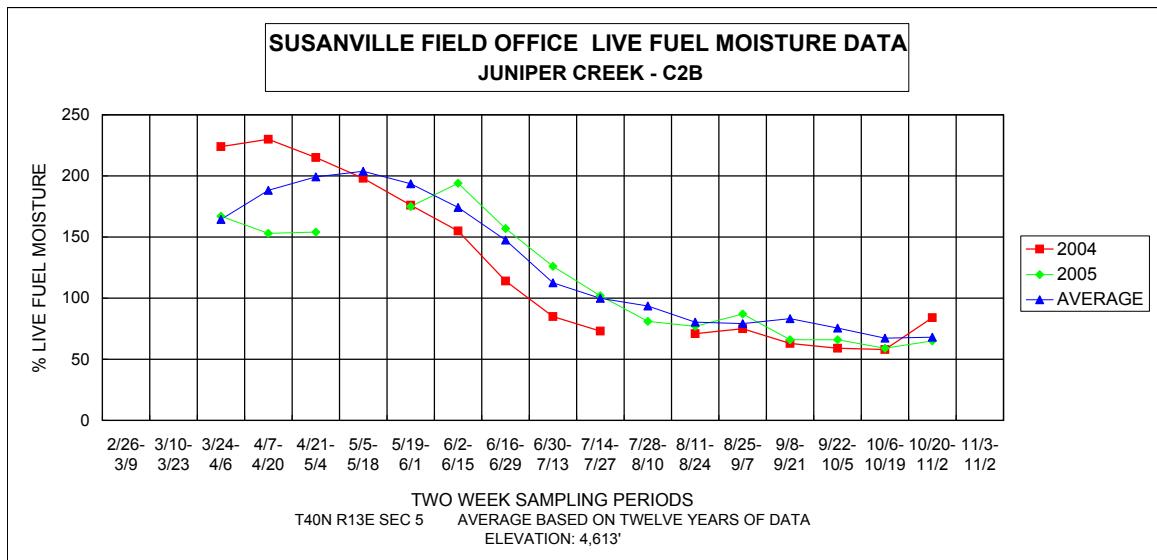
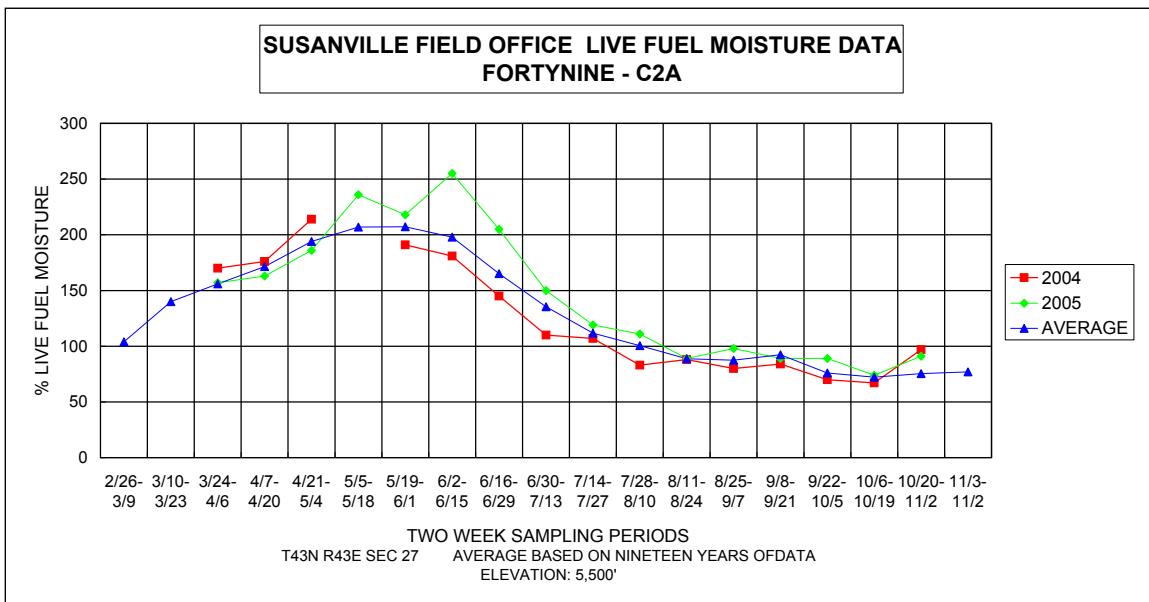
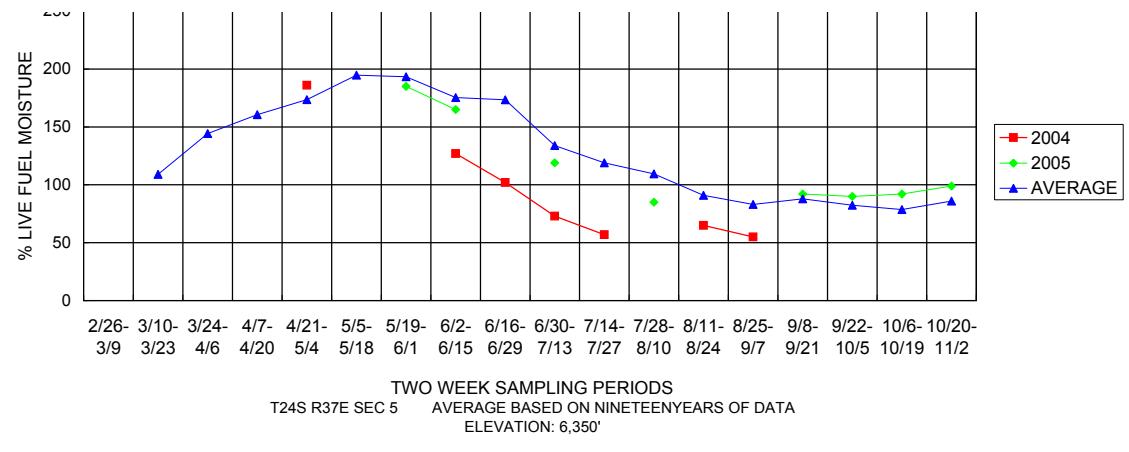




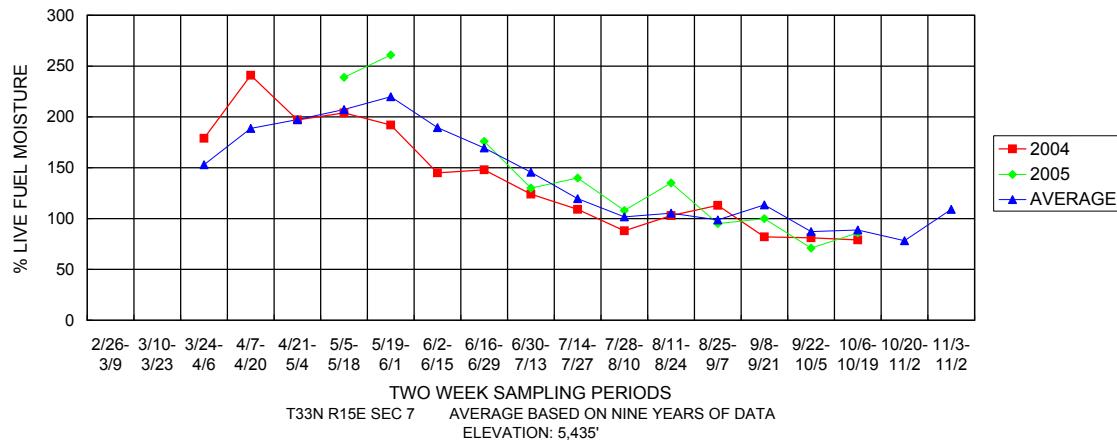




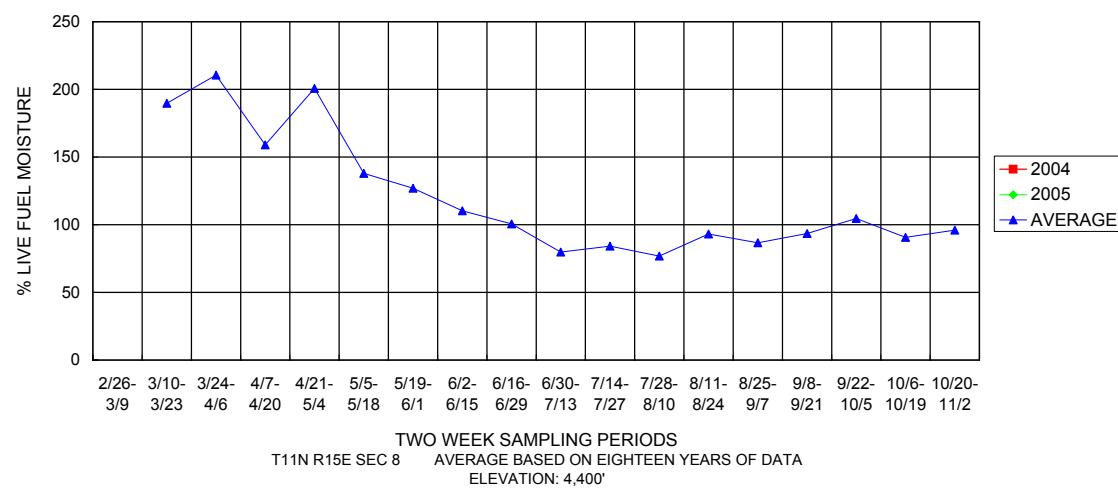


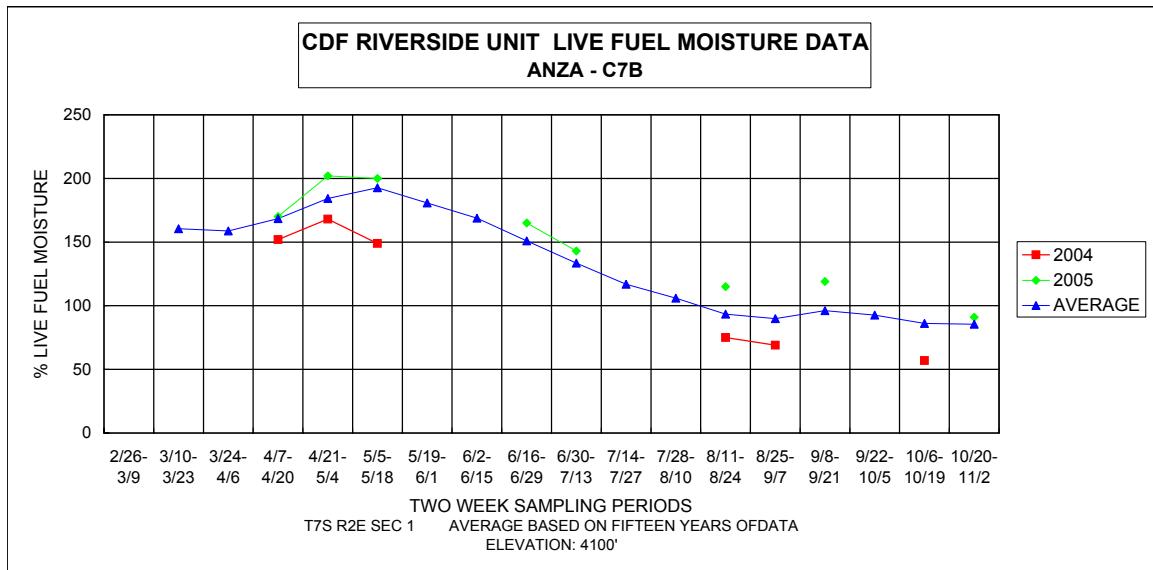
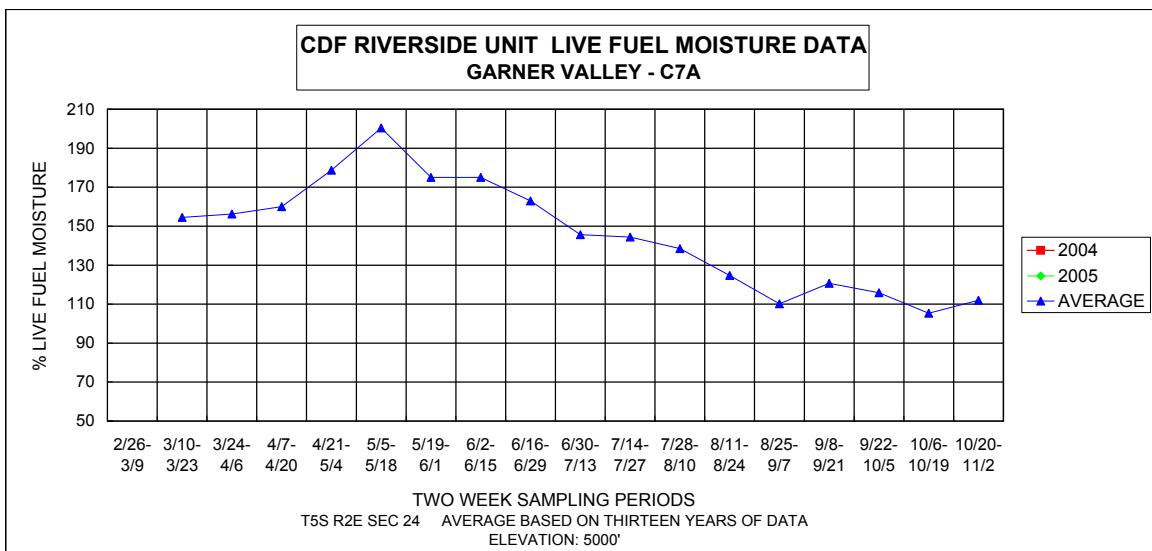


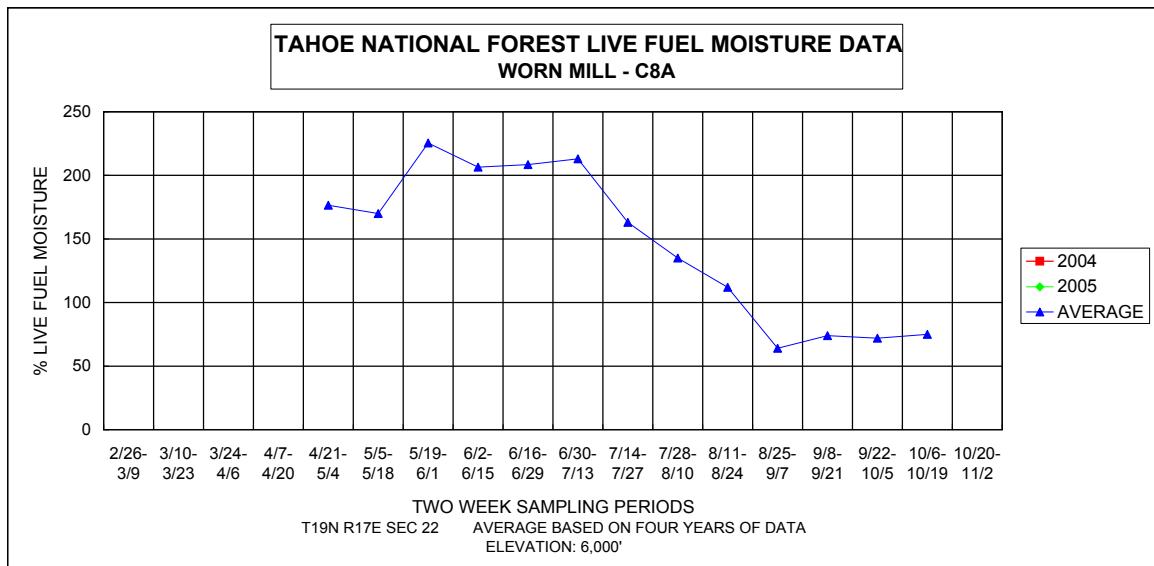
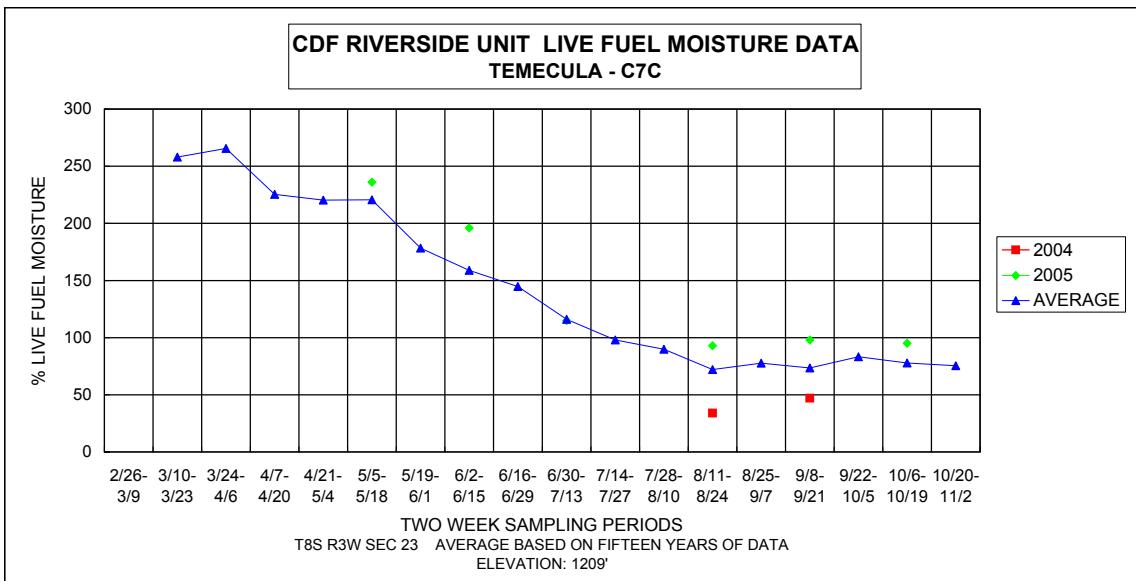
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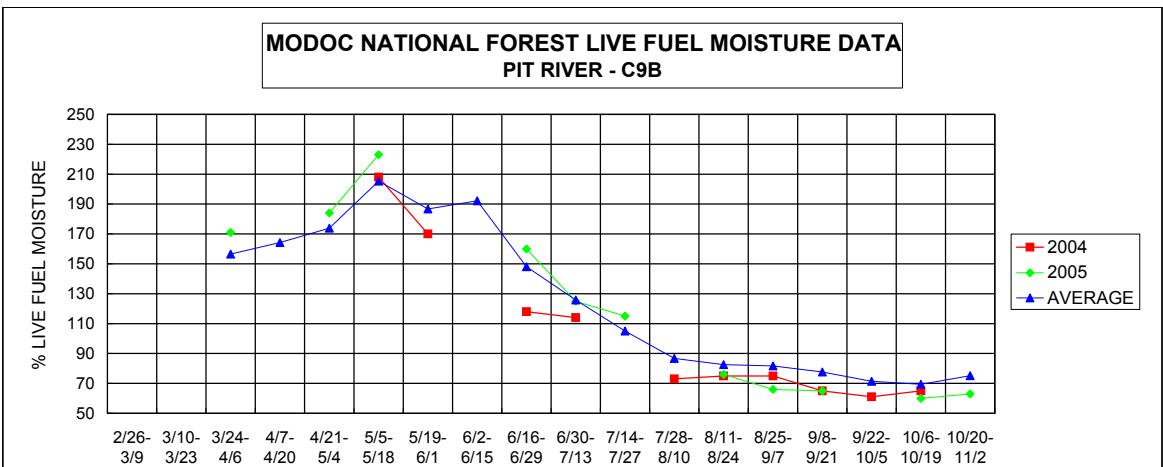
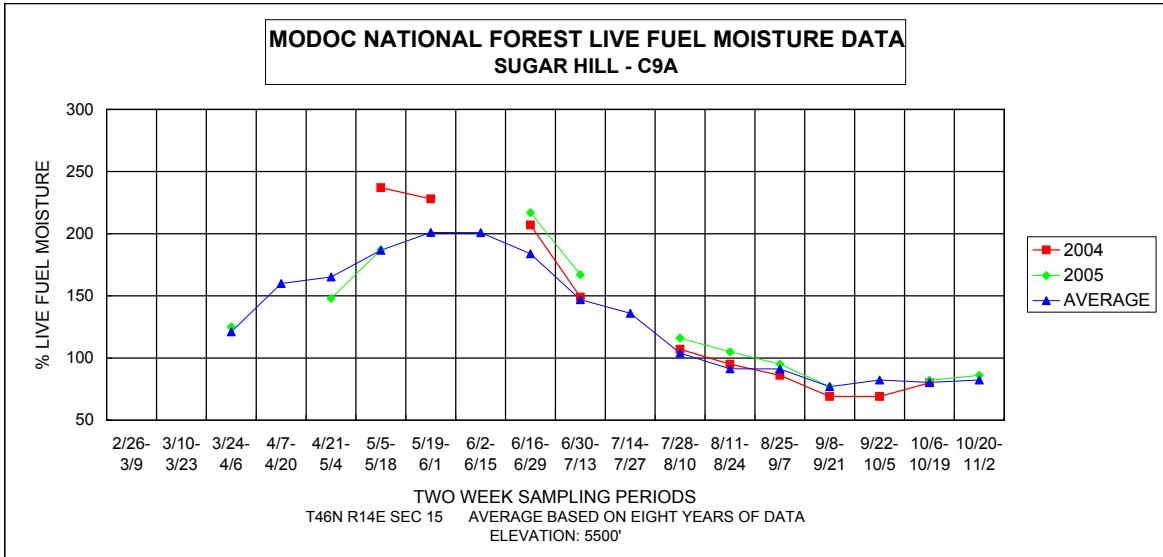


RIVERSIDE FIELD OFFICE LIVE FUEL MOISTURE DATA  
HOLE-IN-WALL - C6A



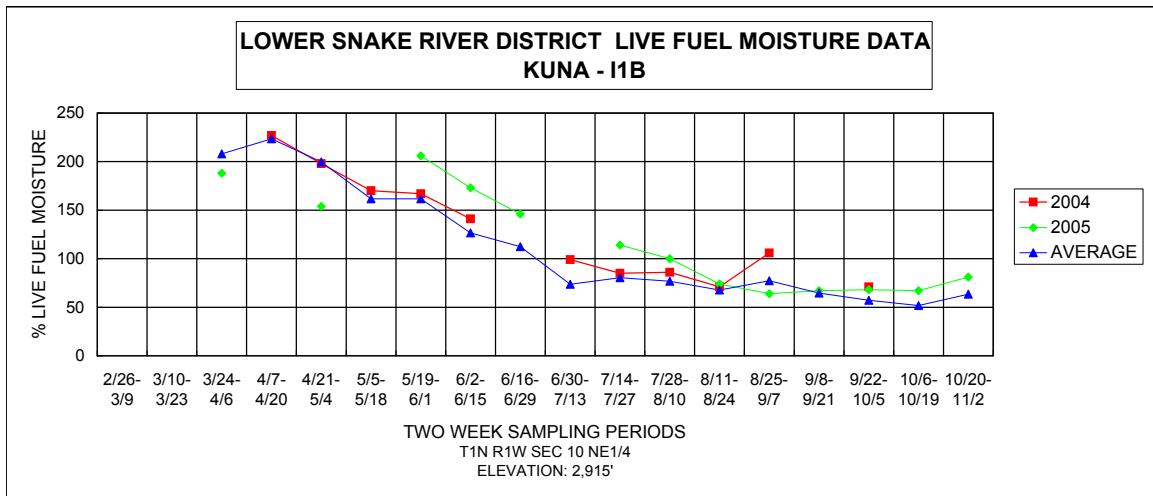
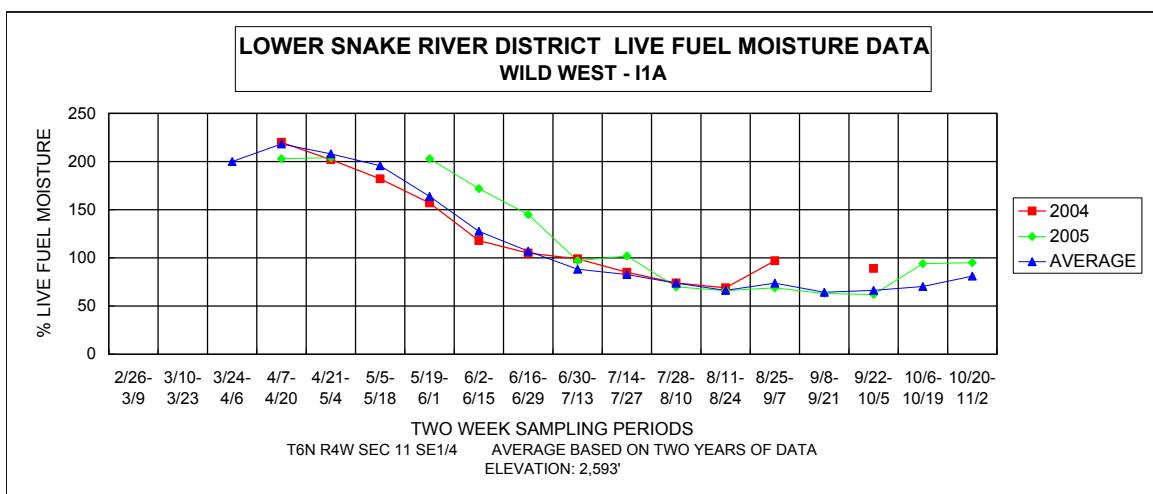
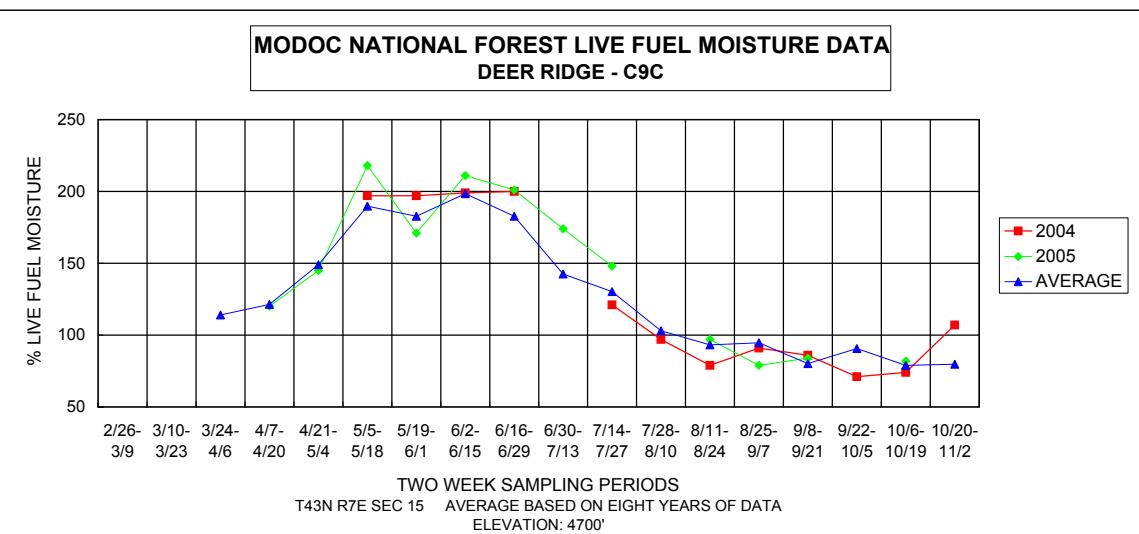


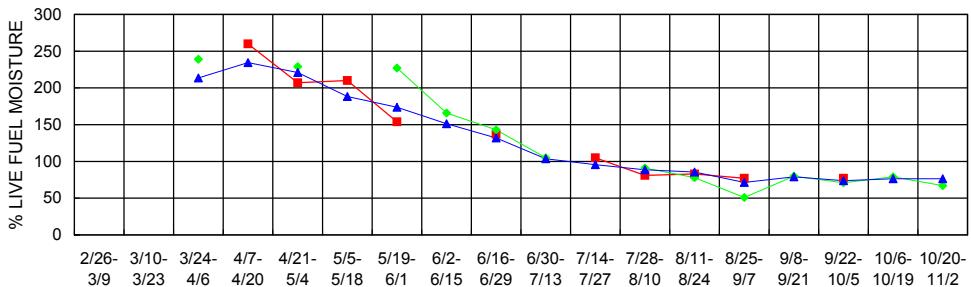




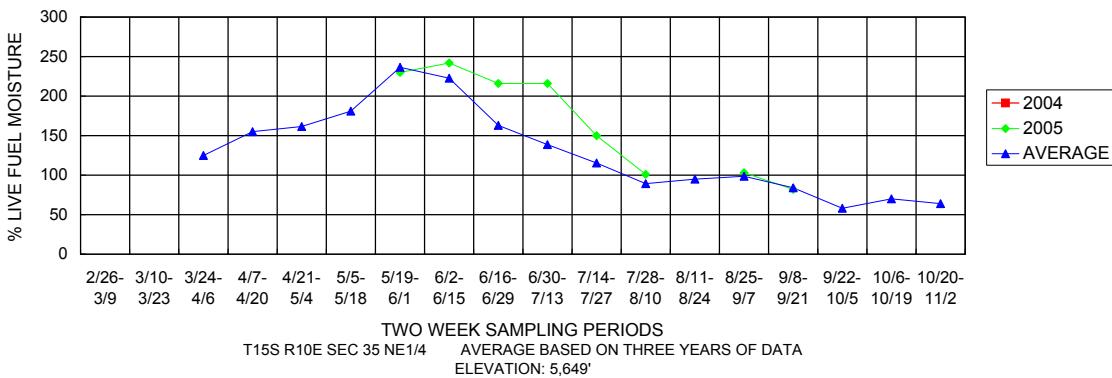
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TWO WEEK SAMPLING PERIODS  
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ELEVATION: 4600'

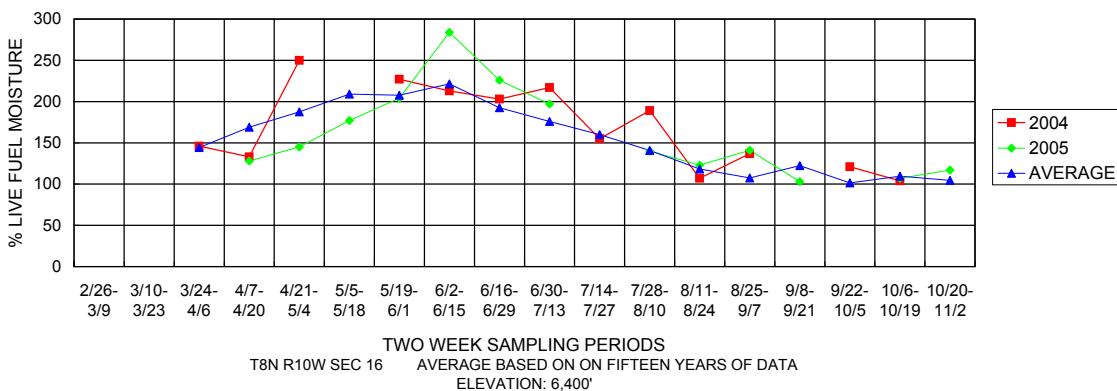




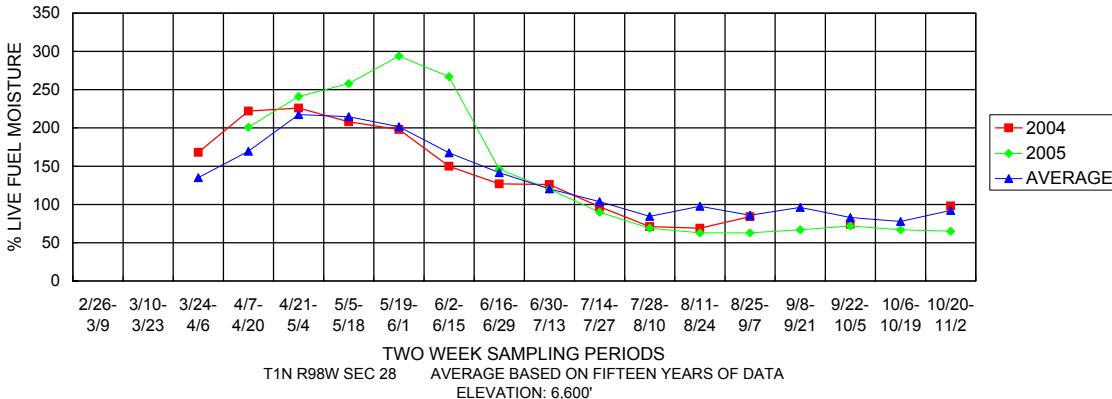
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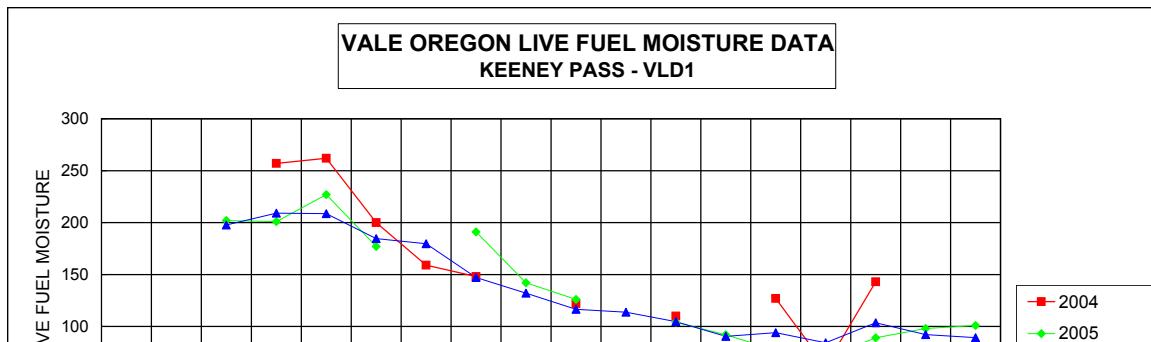
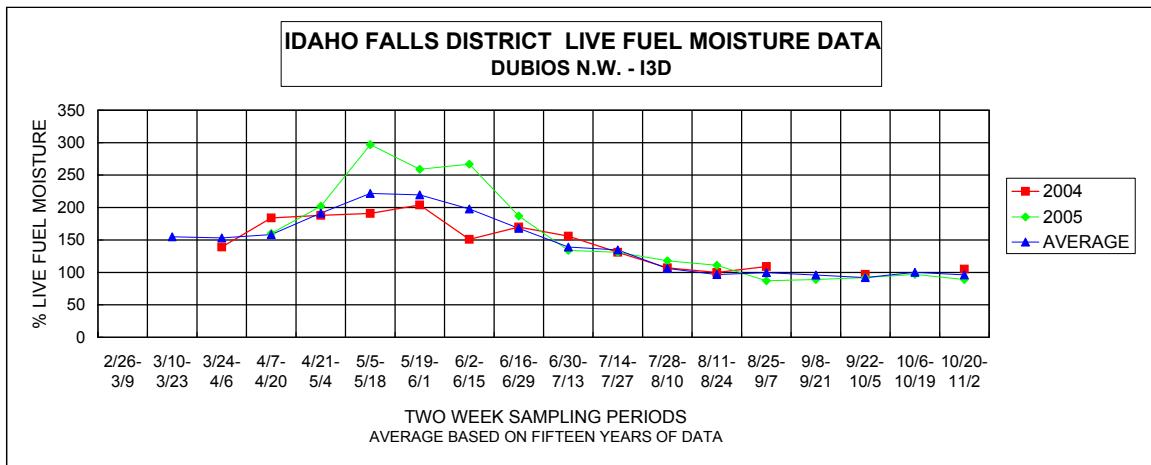
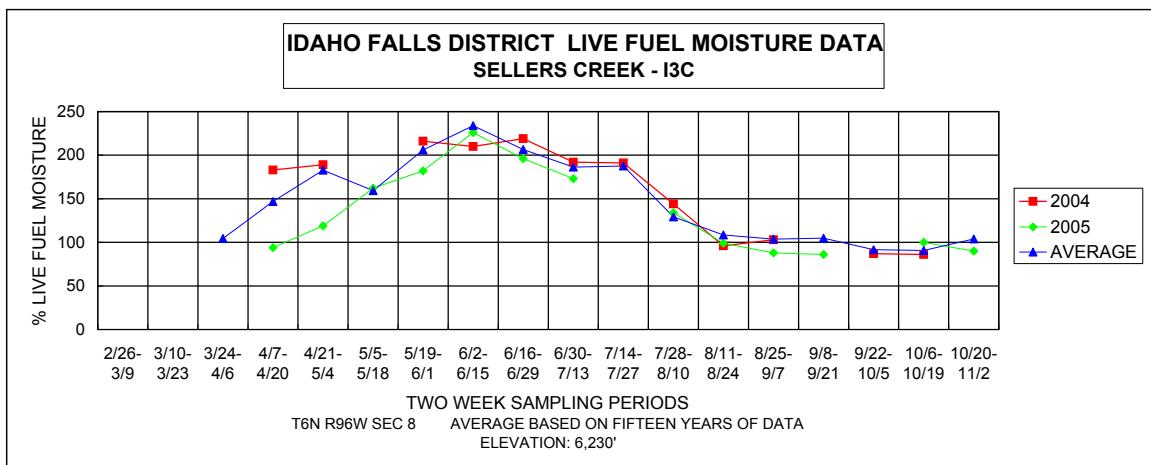


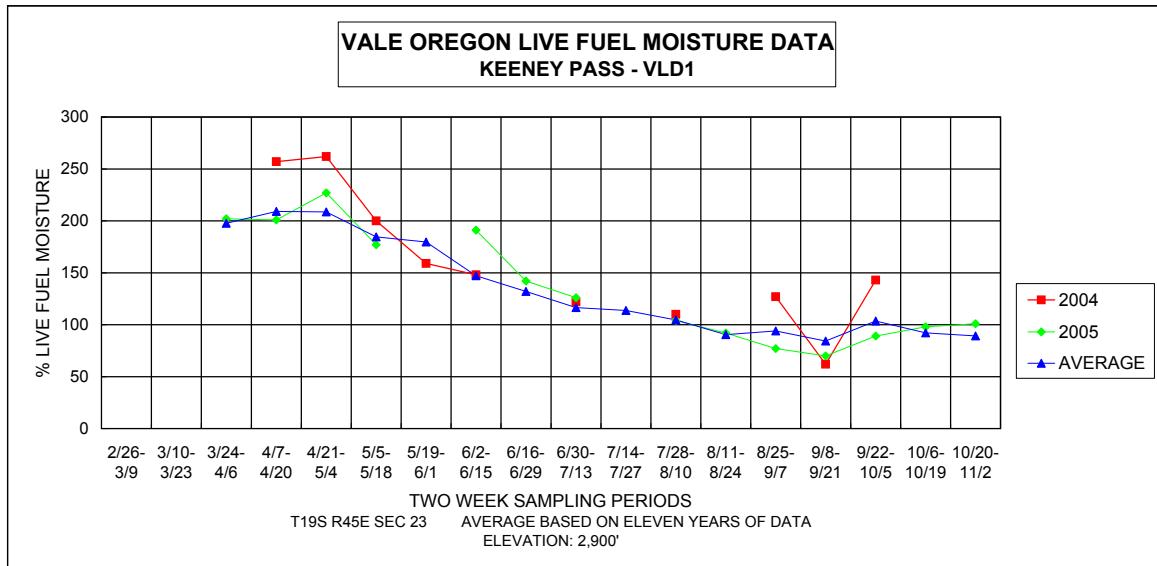
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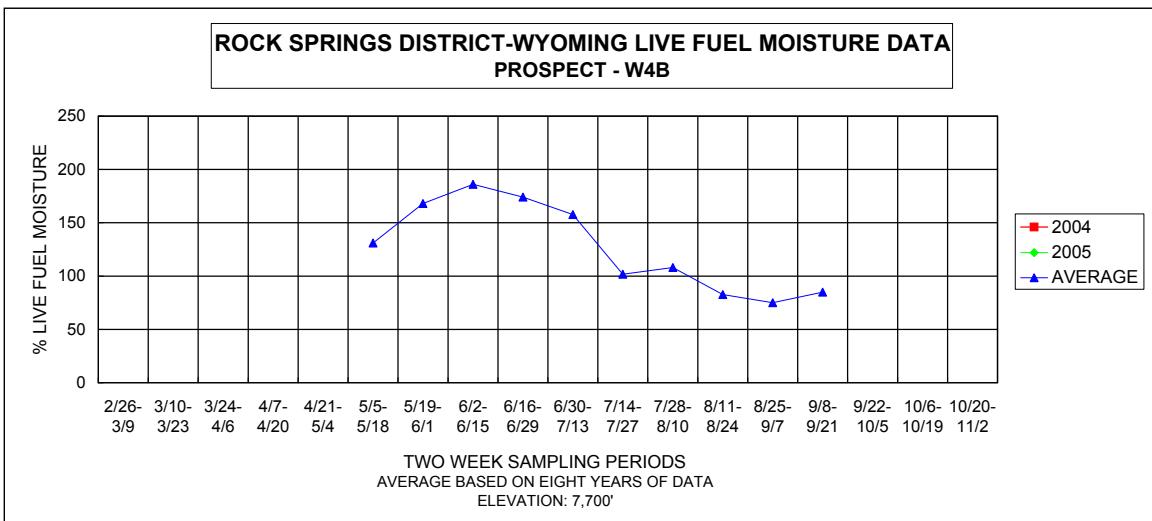
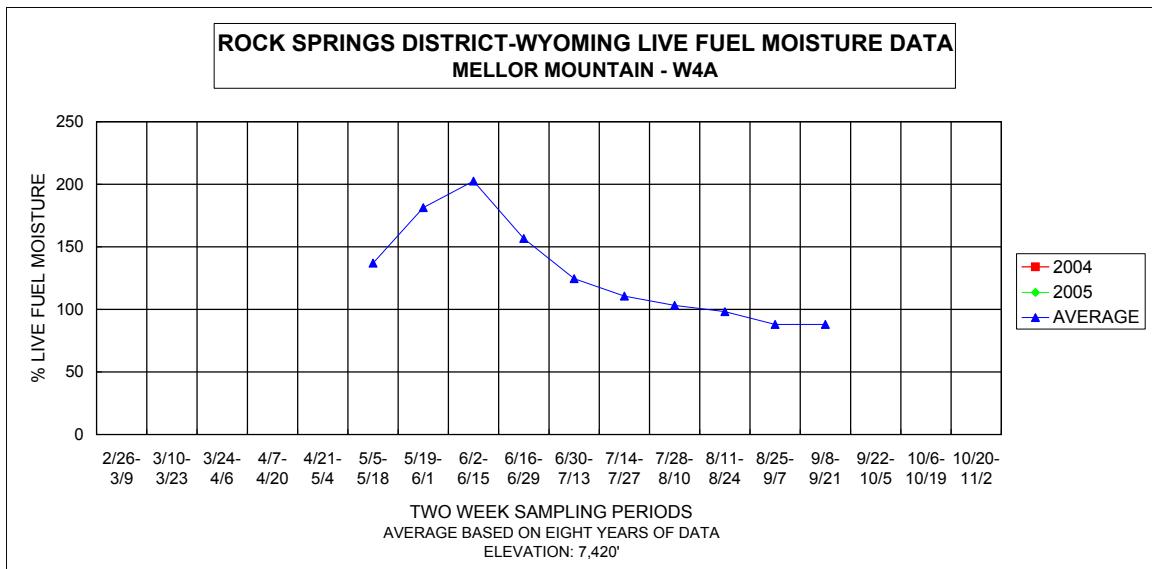


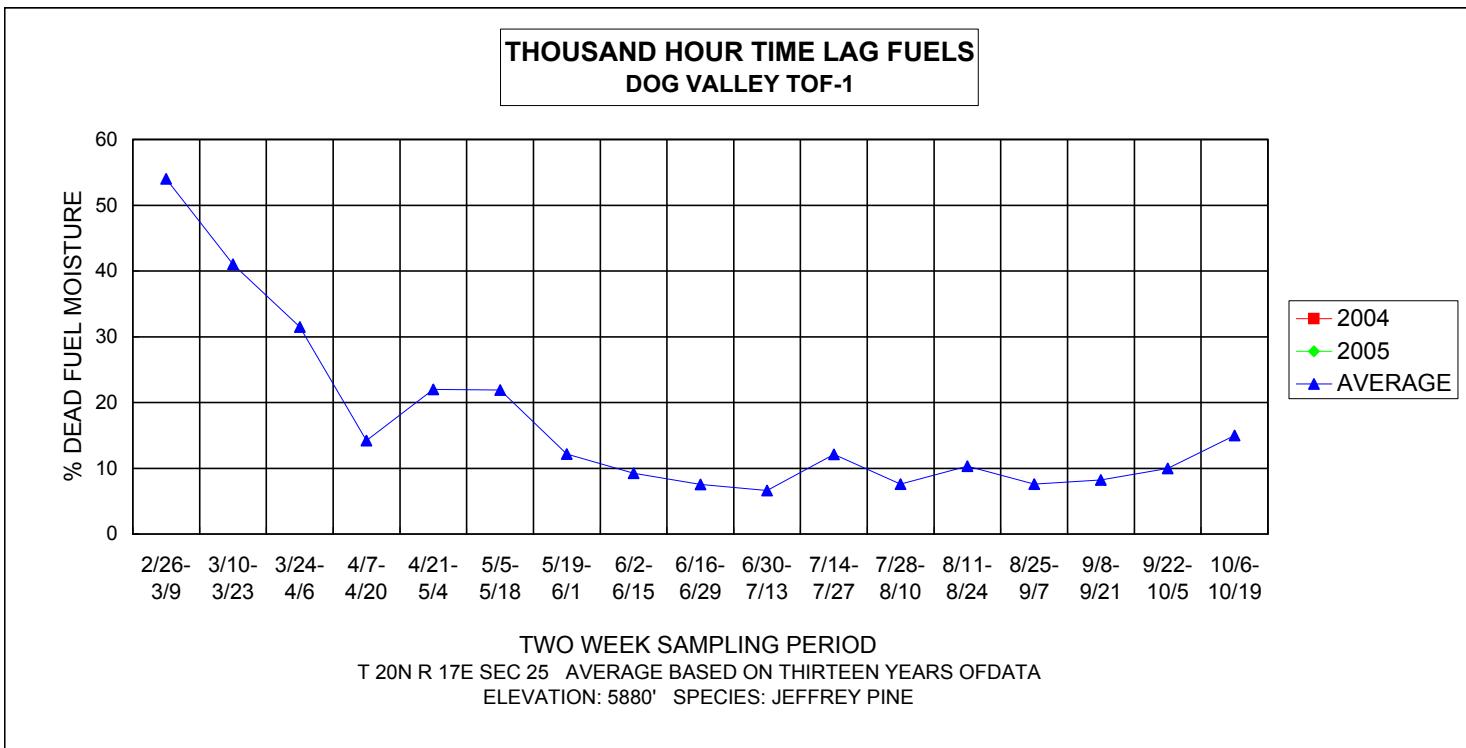
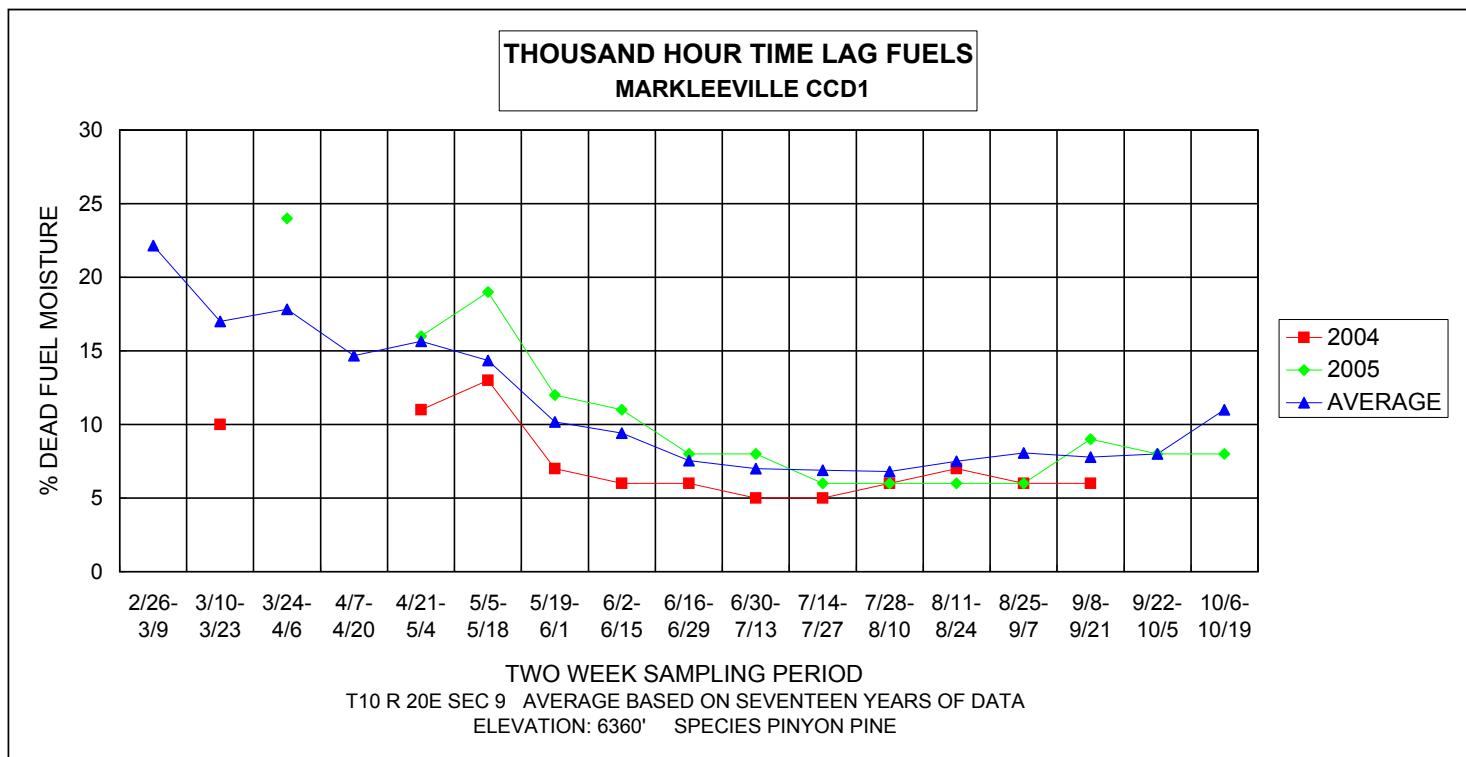
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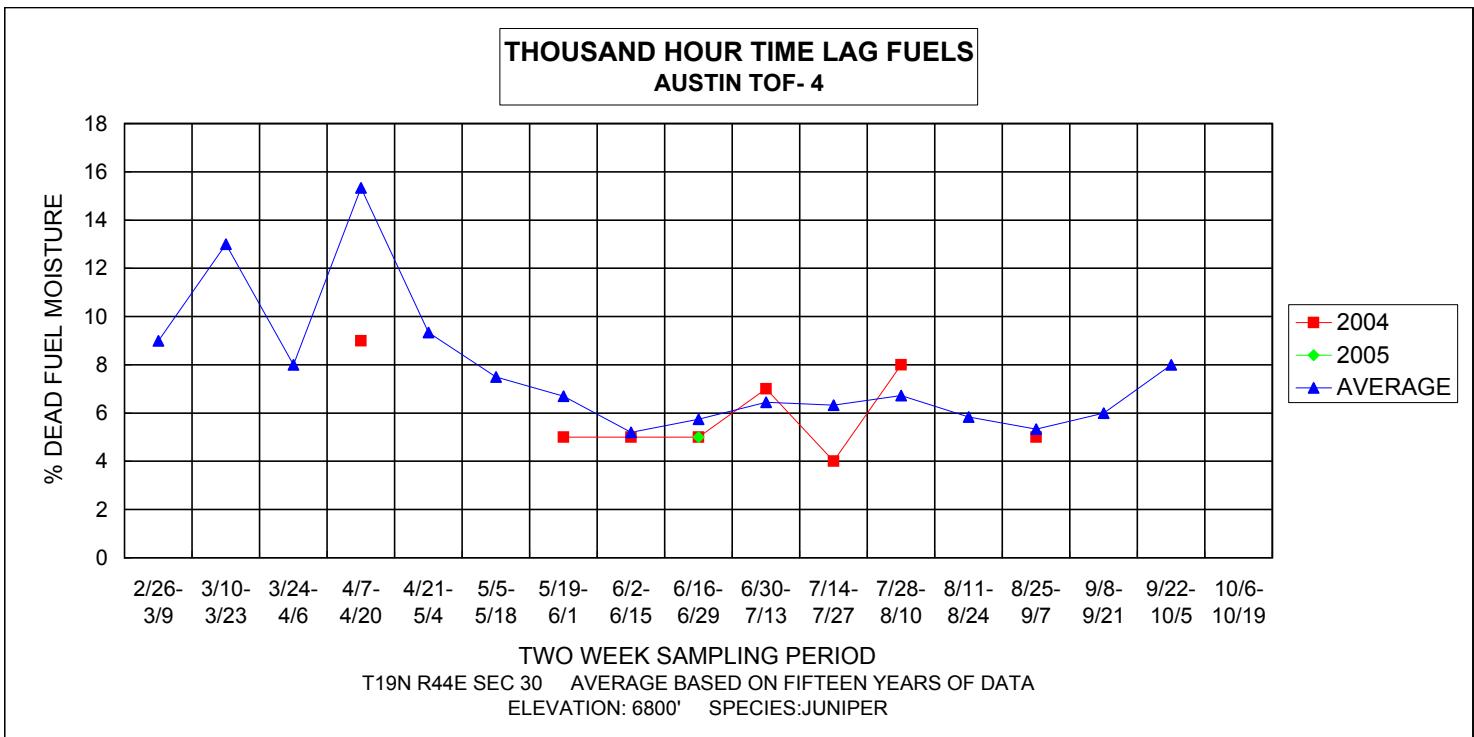
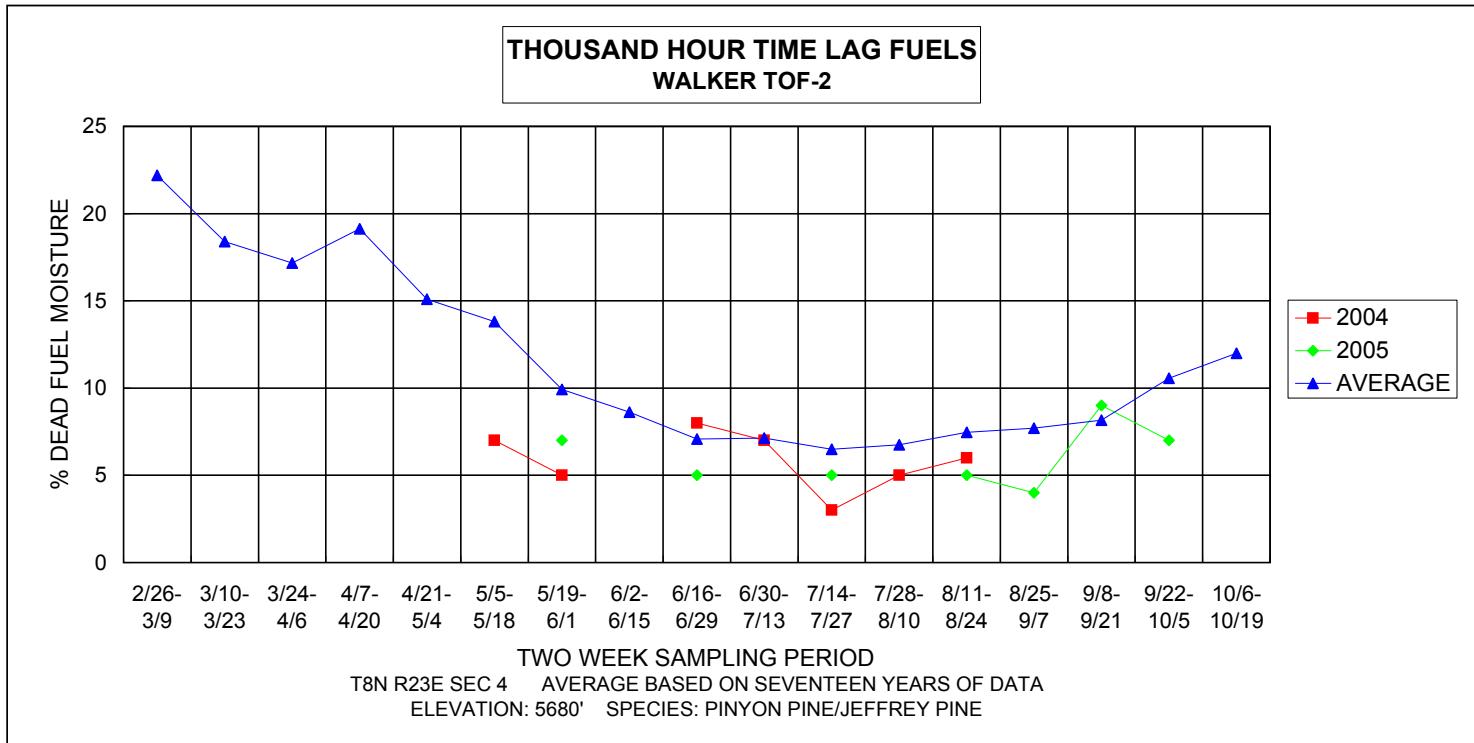




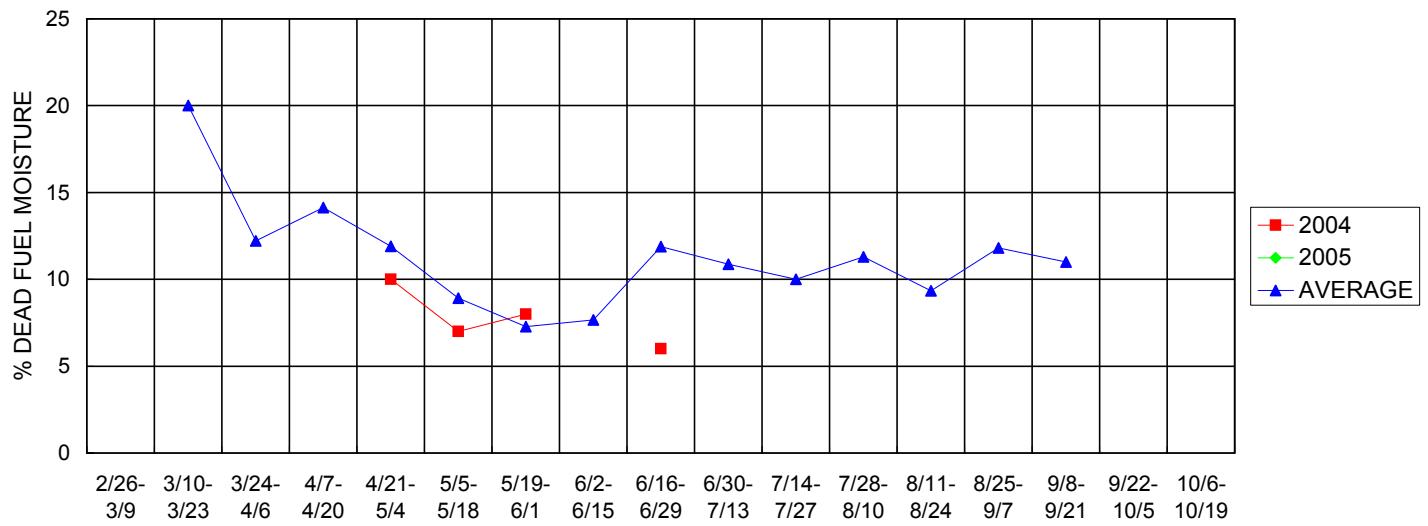




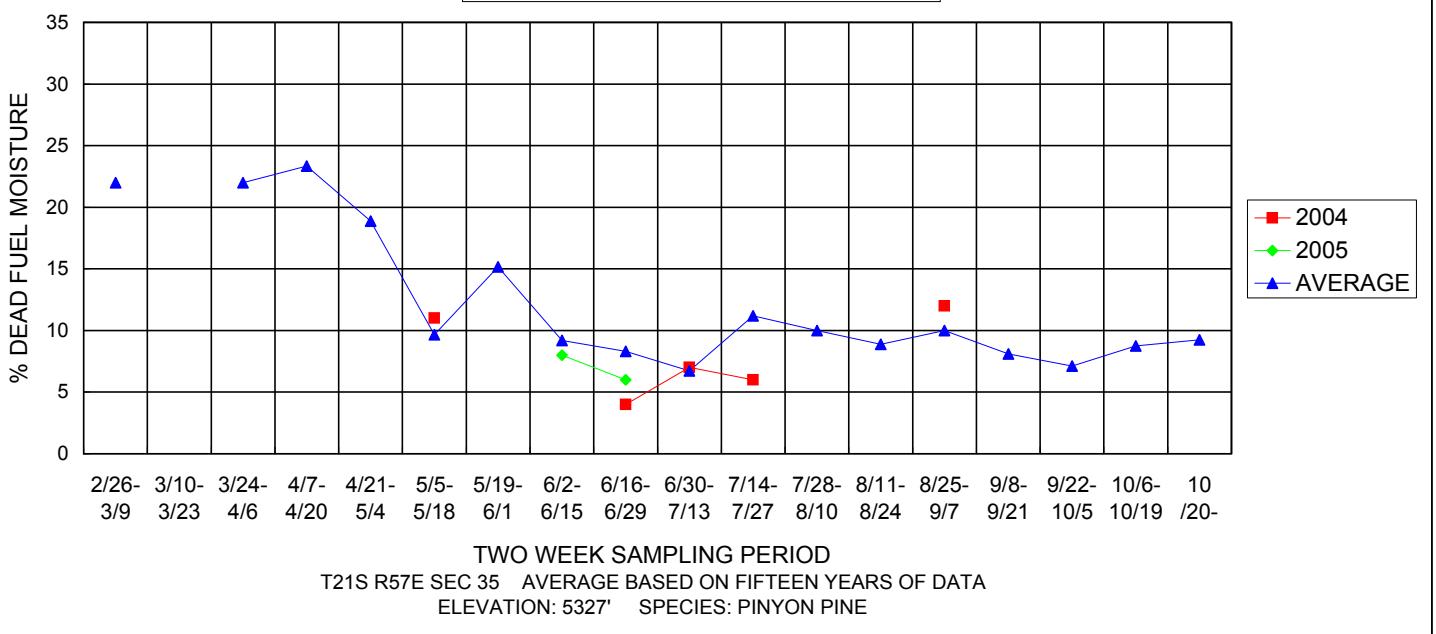


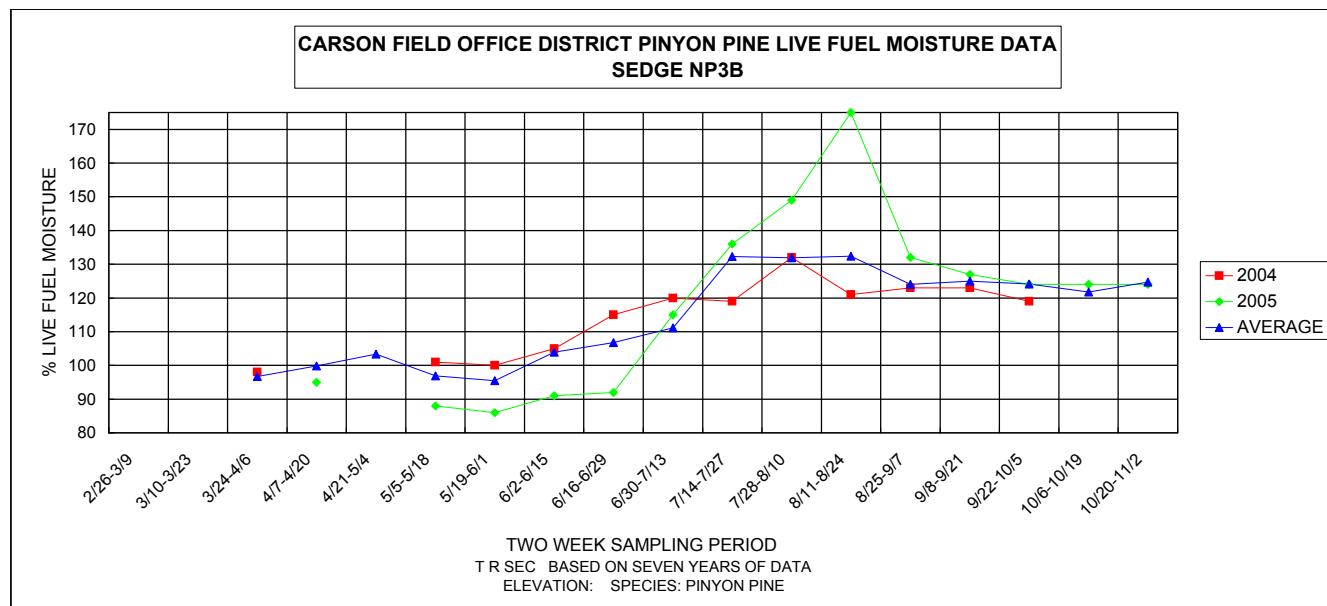
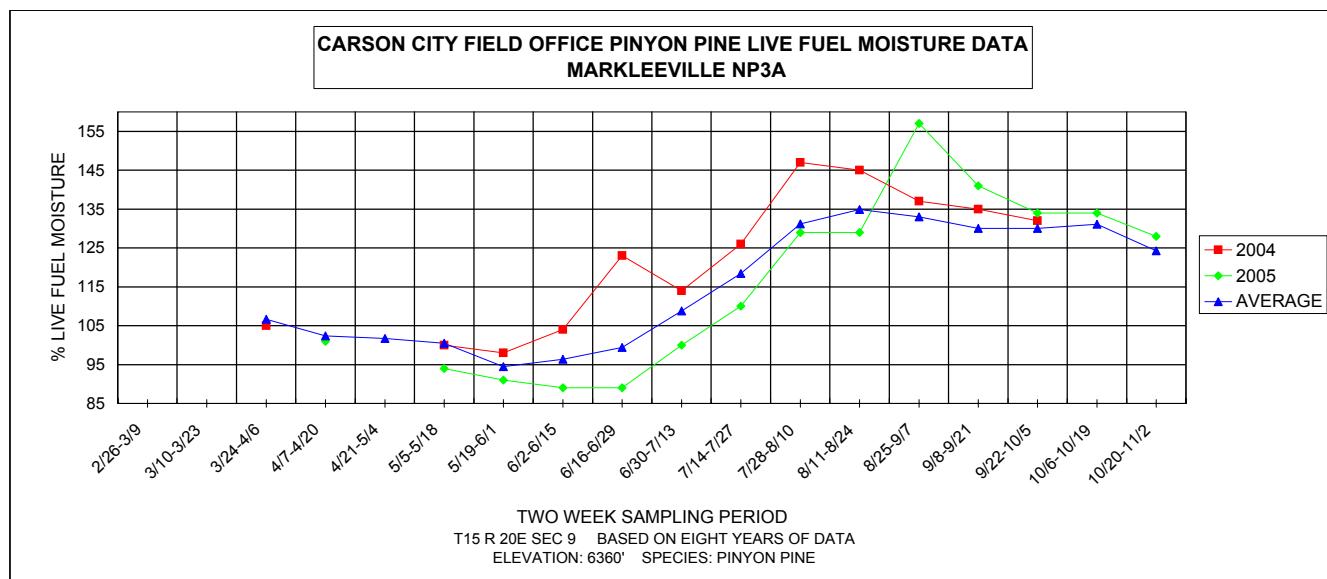
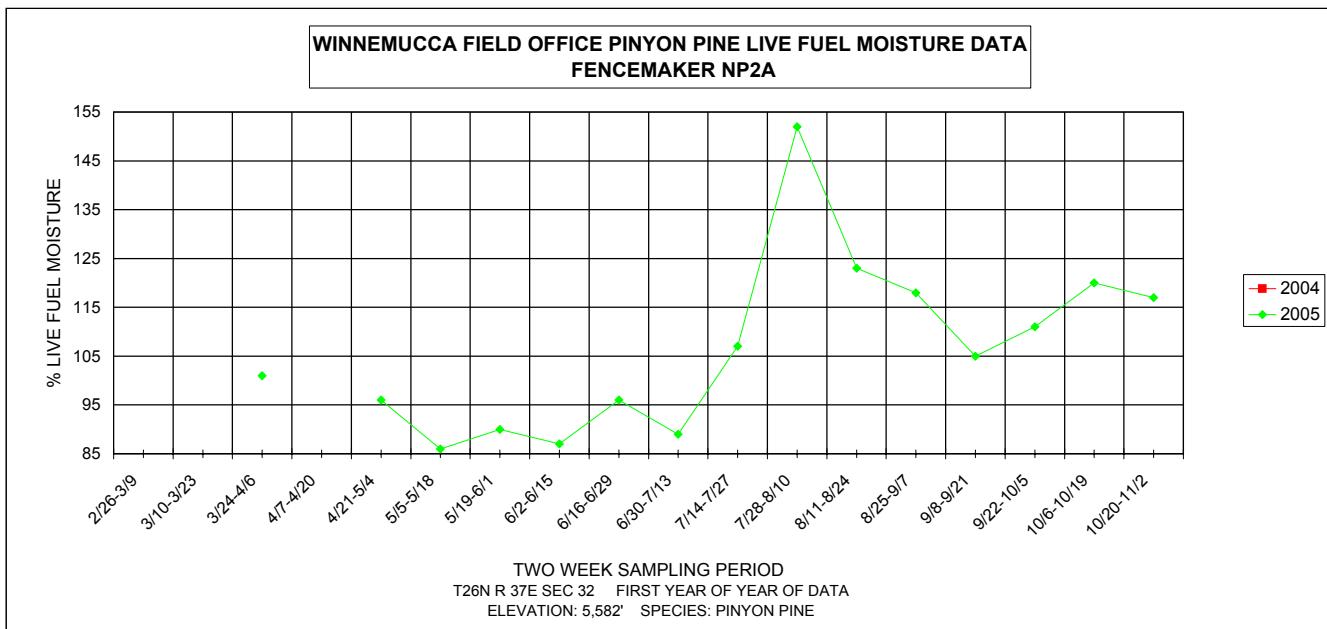


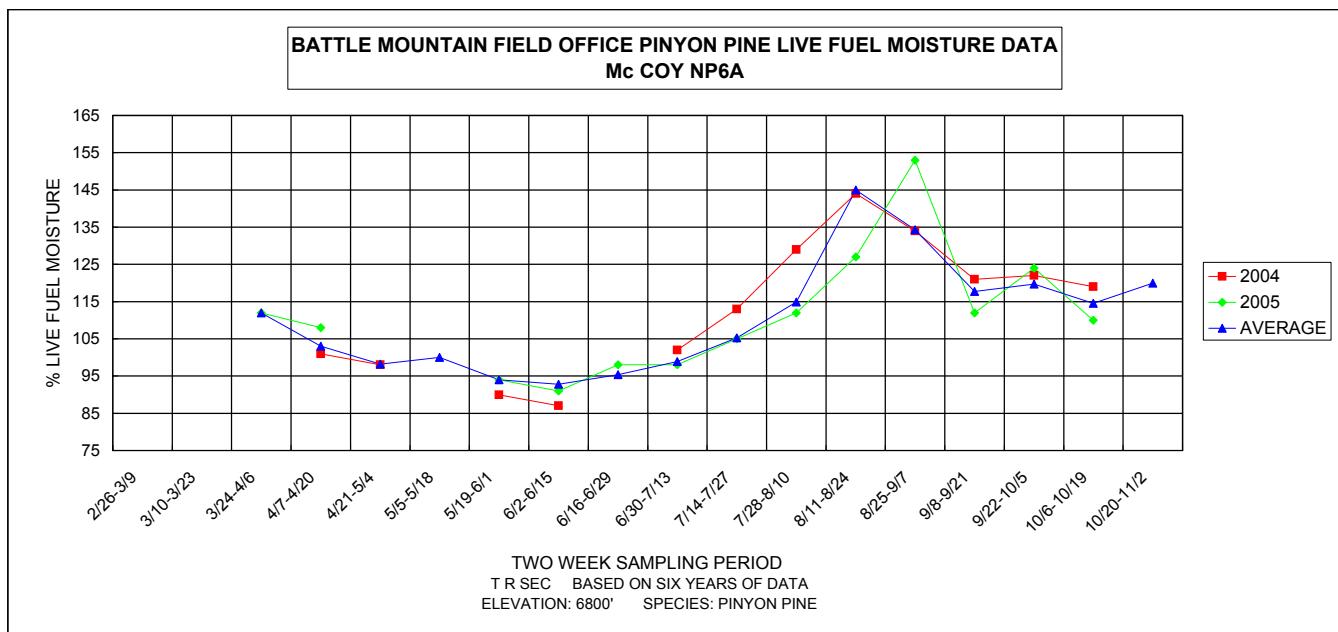
**THOUSAND HOUR TIME LAG FUELS**  
**KYLE TOF- 5**



**THOUSAND HOUR TIME LAG FUELS**  
**LOVELL CANYON TOF- 5B**







## Report of Missed Sampling Dates for 2005

Note: There was a total of 16 sampling days for 2005 fire season.

### **NEVADA**

<b><u>SITE</u></b>	<b><u>LOCATION</u></b>	<b><u>NUMBER OF SAMPLES MISSED</u></b>
N1A	WELLS	7
N1B	ADOBE CREEK	7
N1C	PALISADE	7
N2A	NATIONAL	4
N2B	NEW JUNGO	1
N2C	PANTHER	1
N3A	WARM SPRINGS	5
N3B	CARSON	1
N3C	FISH SPRINGS	4
N3D	DOYLE	3
N4A	DUCK CREEK	5
N4B	RUTH	5
N4C	SAWMILL	5
N5A	PIOCHE	0
N5B	RAINBOW CANYON	0
N5C	KYLE CANYON	16
N5D	LOVELL CANYON	15
N5E	RED ROCK	2
N5F	PINE CREEK	2
N5G	BOOTLEG	15
N6A	BATTLE MOUNTAIN	7
N6B	AUSTIN	10
N6C	LUCKY SPRINGS	1

**CALIFORNIA**

<u>SITE</u>	<u>LOCATION</u>	<u>NUMBER OF SAMPLES MISSED</u>
C1A	TOPAZ	16
C1B	BENTON	16
C1C	CHIMNEY	7
C2A	FORTYNINE	0
C2B	JUNIPER CREEK	1
C2D	RAVENDALE	5
C6A	HOLE-IN-WALL	16
C7A	KEEN WILD	16
C7B	ANZA	7
C7C	TEMECULA	9
C8A	WORN MILL	16
C9A	SUGAR HILL	5
C9B	PIT RIVER	5
C9C	DEER RIDGE	4

**IDAHO**

I1A	WILD WEST	2
I1B	KUNA	3
I1C	HAMMETT	3
I1D	THREE CREEK	8
I3A	SODA SPRINGS	3
I3B	TABLE LEGS BUTTE	1
I3C	SELLERS CREEK	3
I3D	DUBOIS	1

**OREGON**

VLD1	KEENEY PASS	2
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**WYOMING**

<u>SITE</u>	<u>LOCATION</u>	<u>NUMBER OF SAMPLES MISSED</u>
W4A	MELLOR MOUNTAIN	16
W4B	PROSPECT	16

**PINYON**

NP2A	FENCEMAKER	1
NP3A	MARKLEEVILLE	2
NP3B	SEDGE	2
NP6A	McCOY RIDGE	3

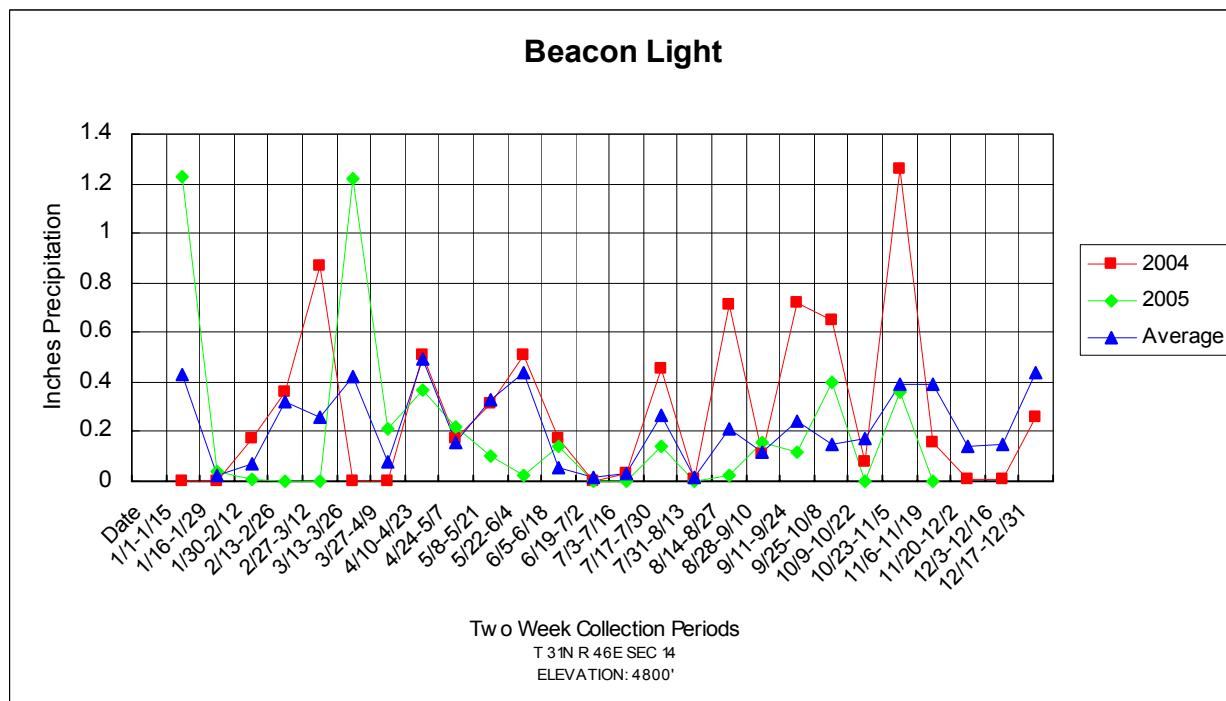
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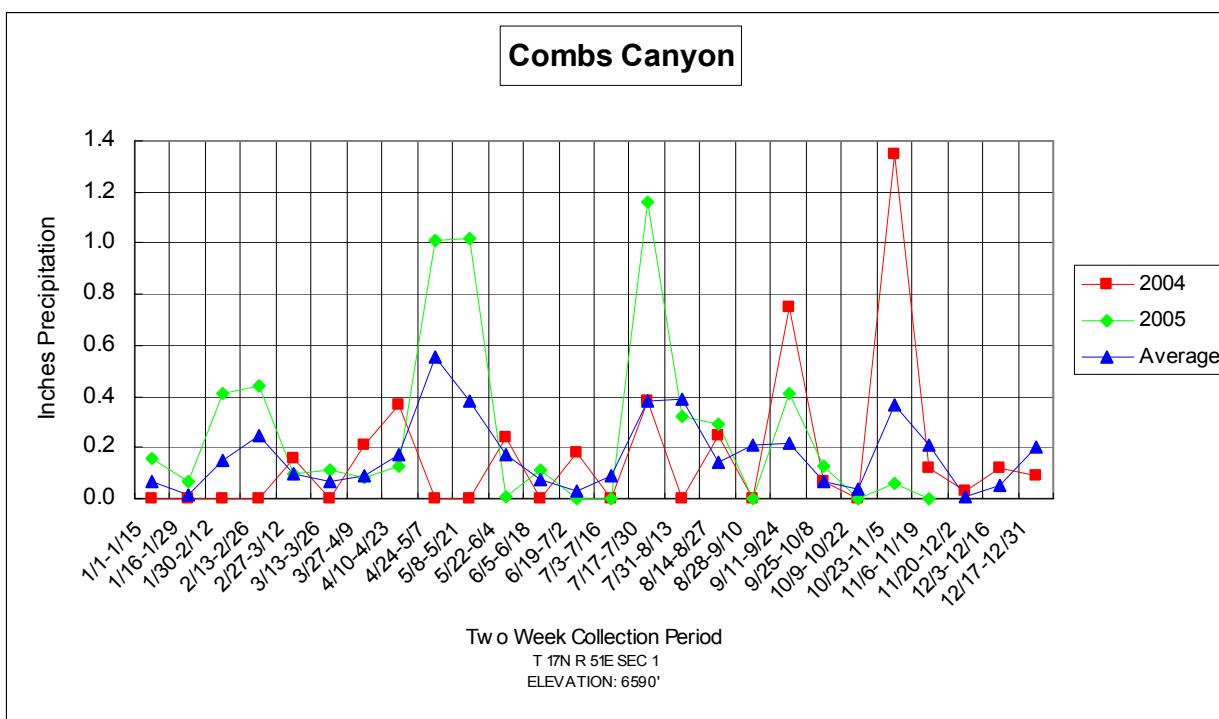
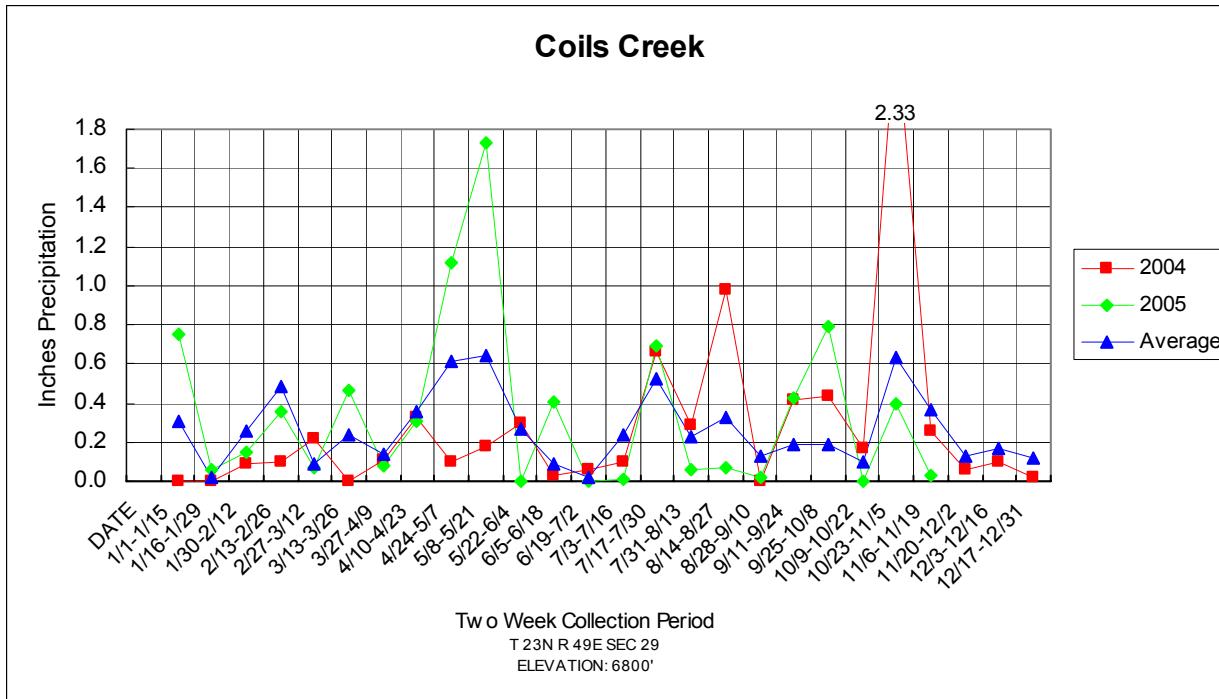
CCD	MARKEEVILLE	2
TOF1	DOG VALLEY	16
TOF2	WALKER	9
TOF4	AUSTIN	15
TOF5	KYLE	16
TOF5B	LOVELL CANYON	14

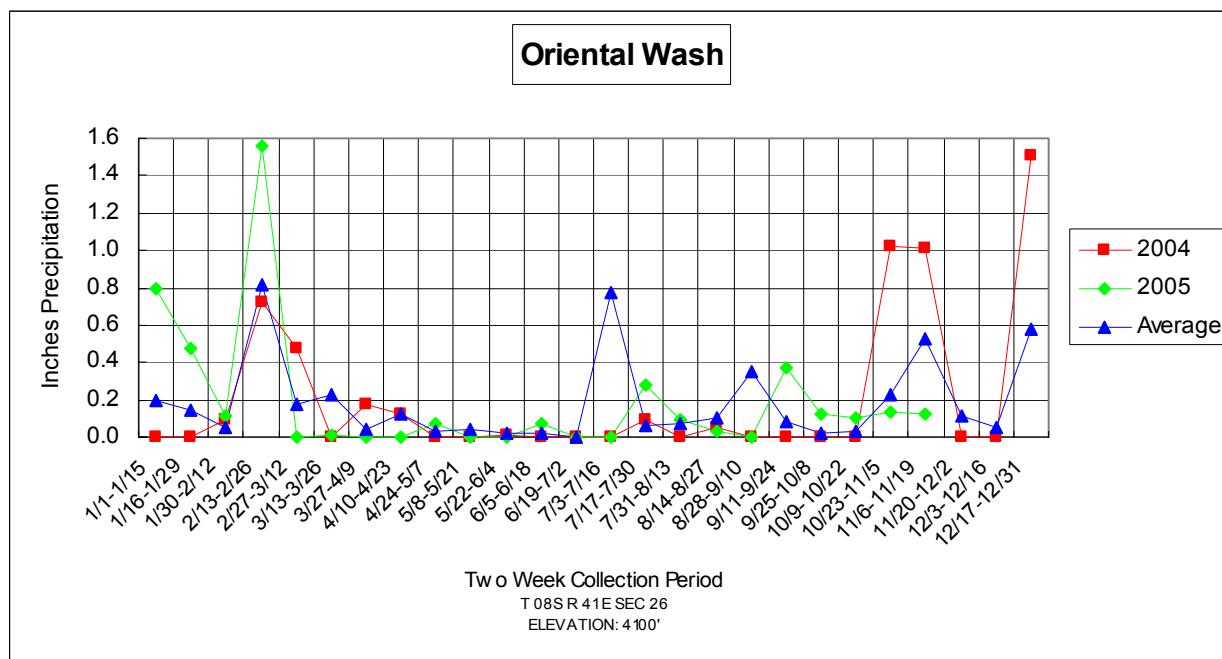
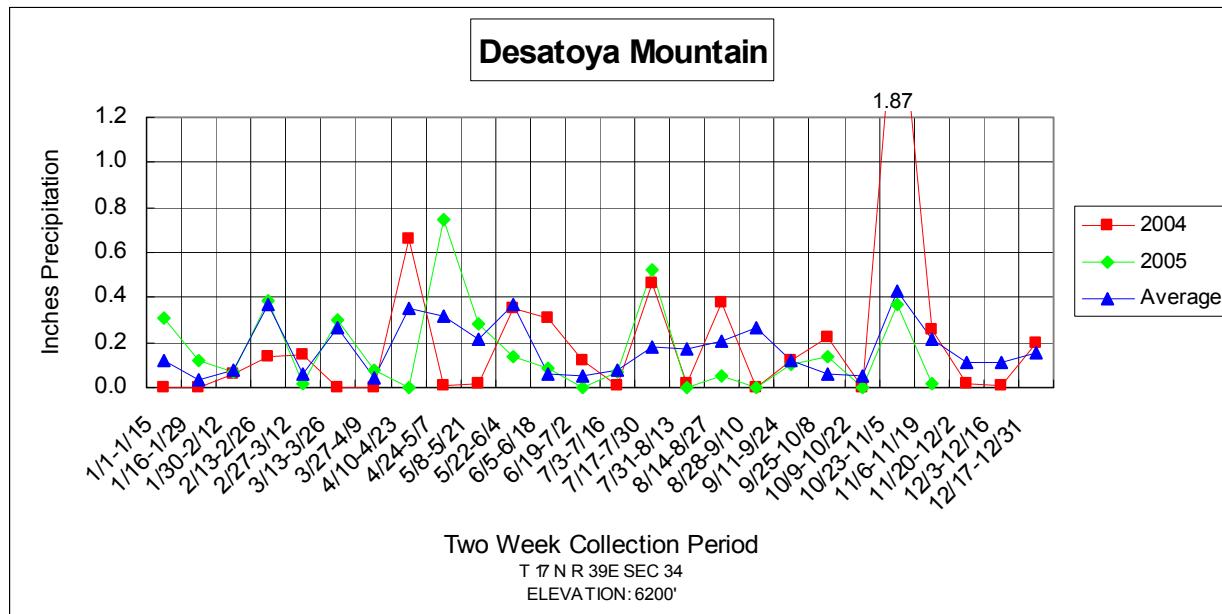
# PRECIPITATION GRAPHS

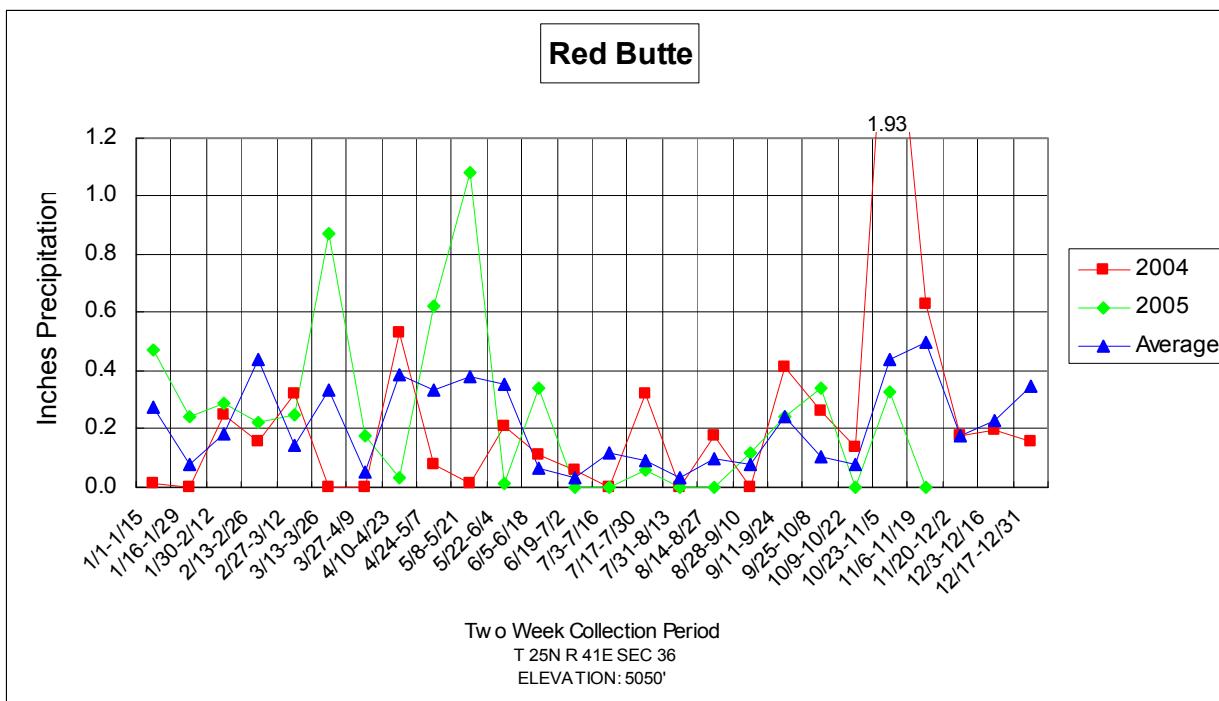
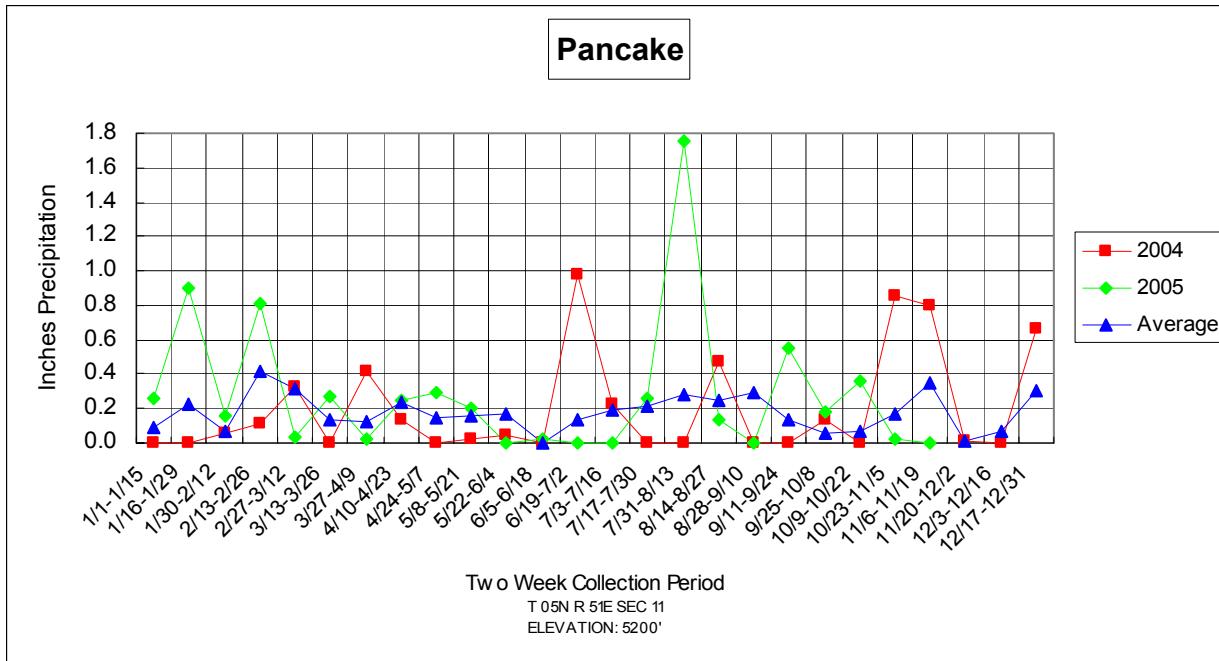
## 2005 Fire Season

### BATTLE MOUNTAIN

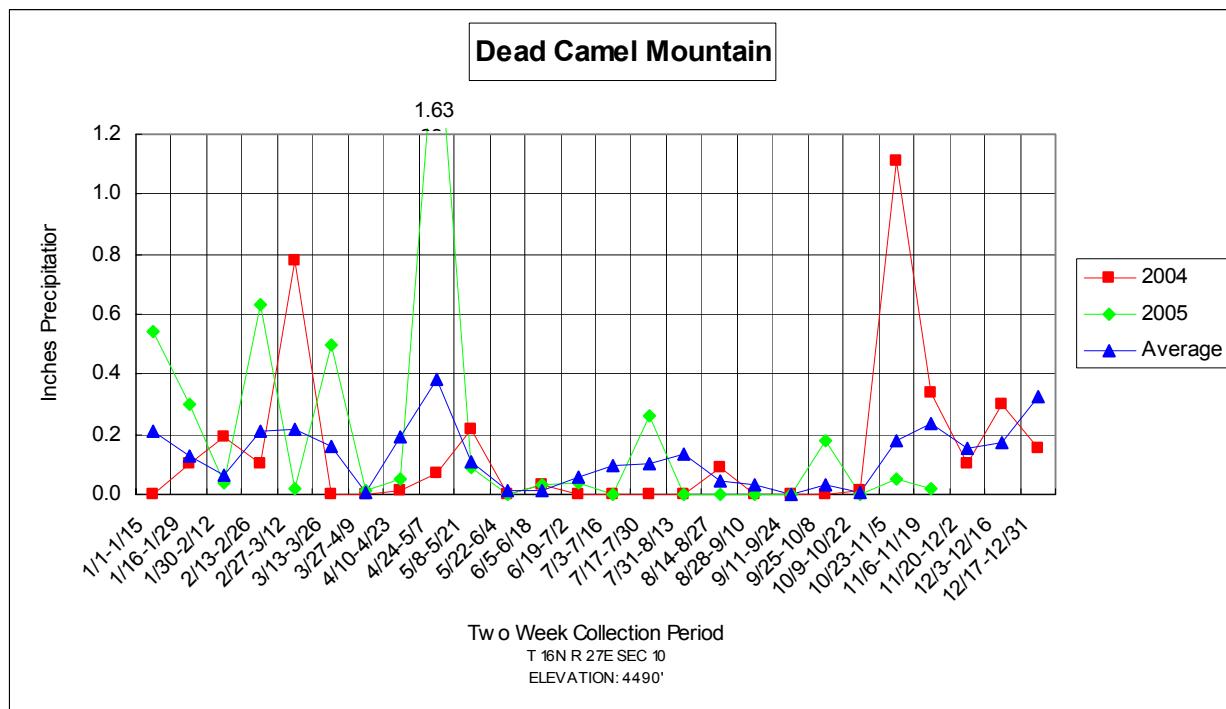
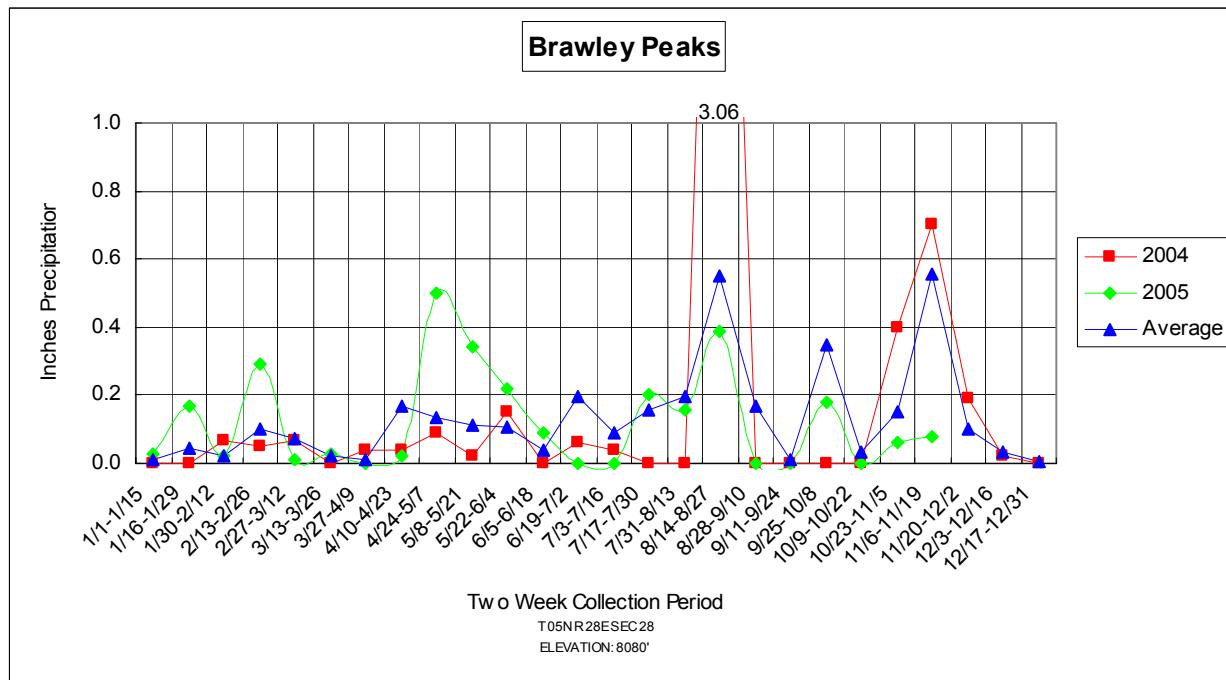


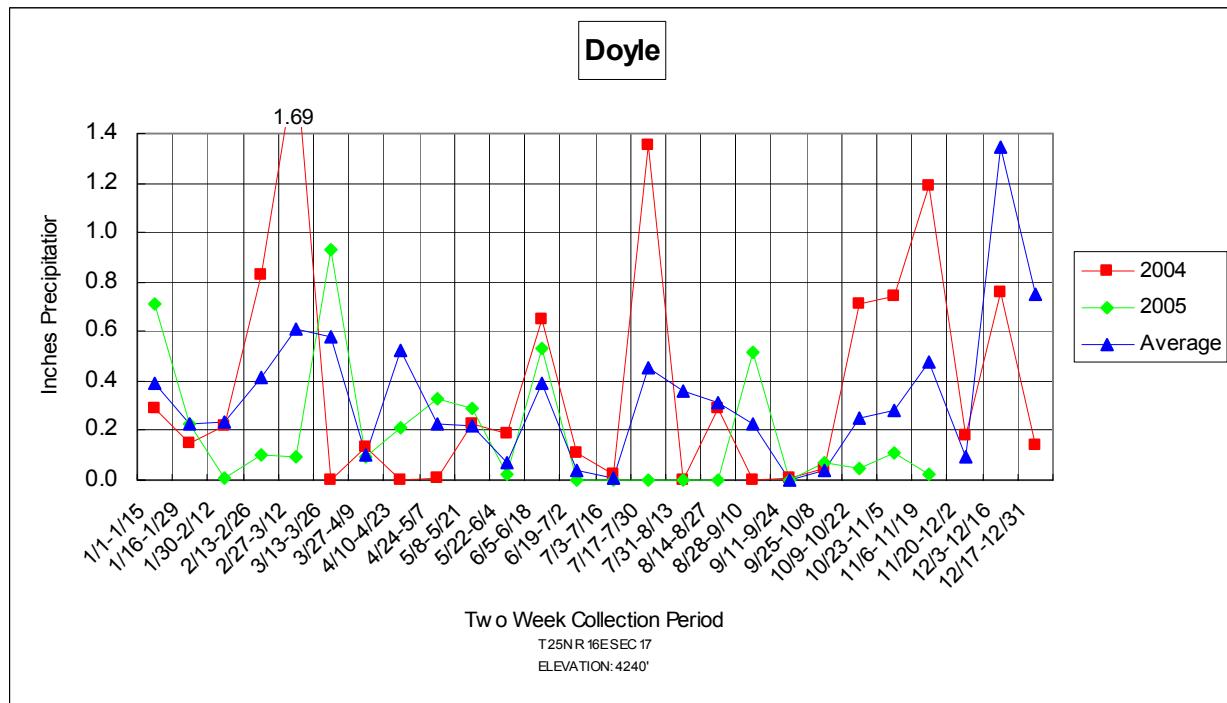
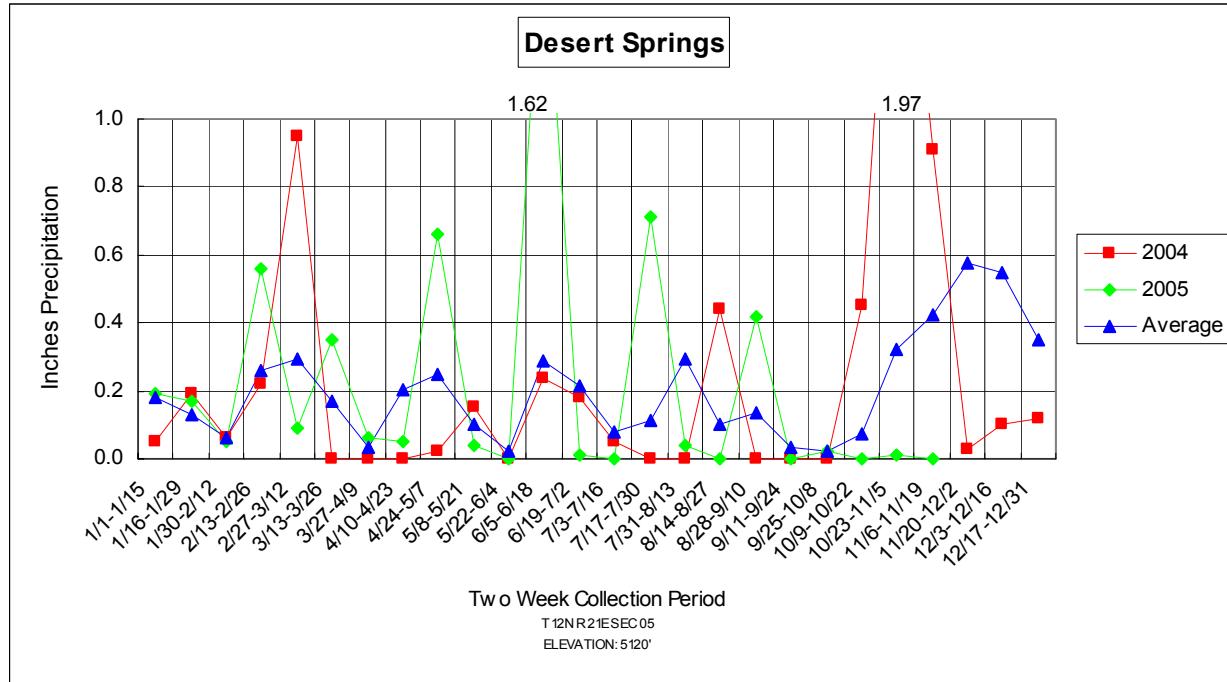


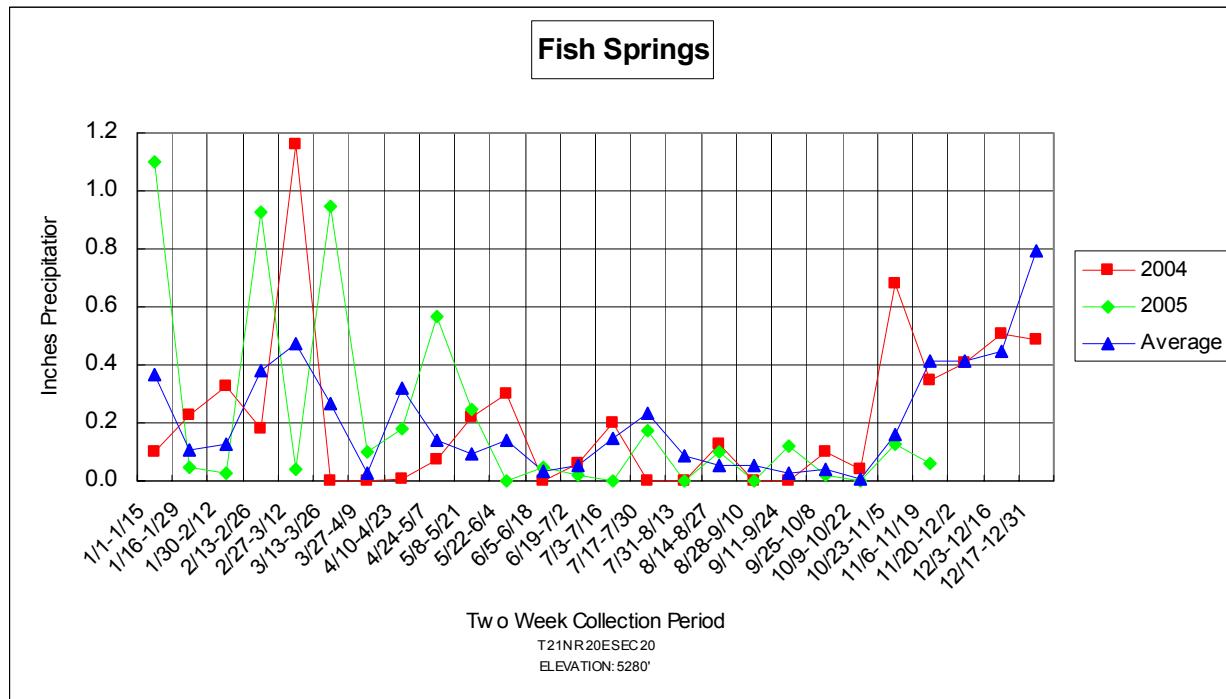




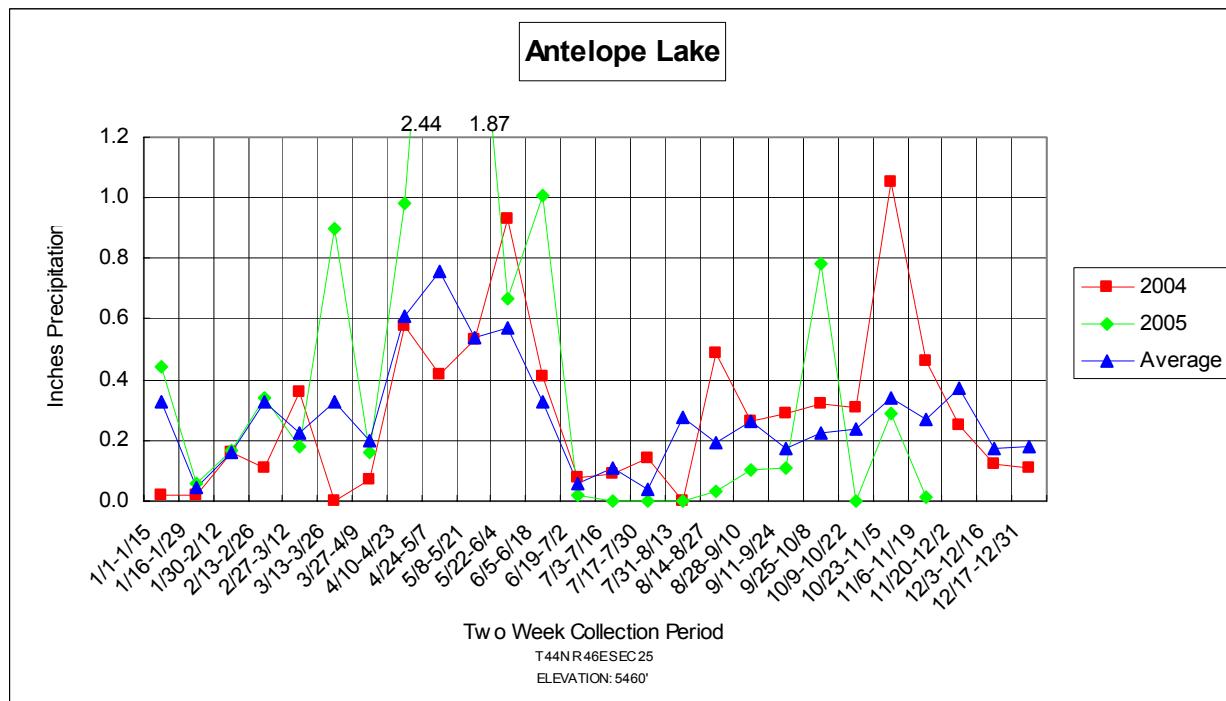
## CARSON CITY

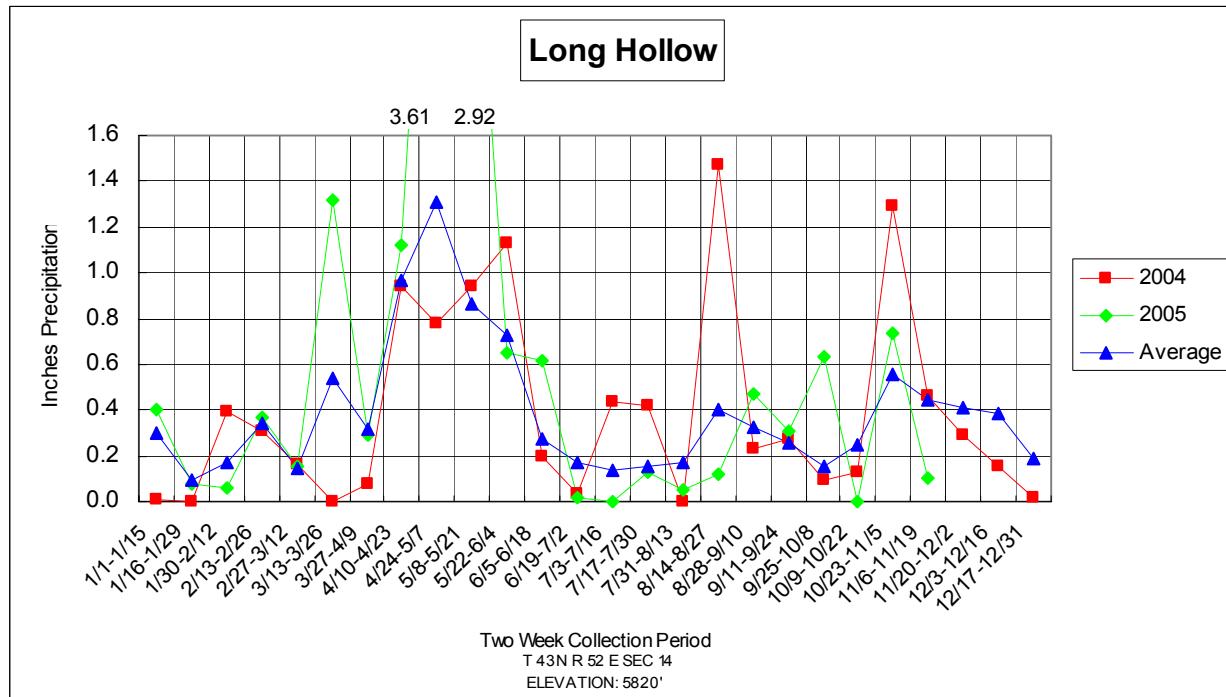
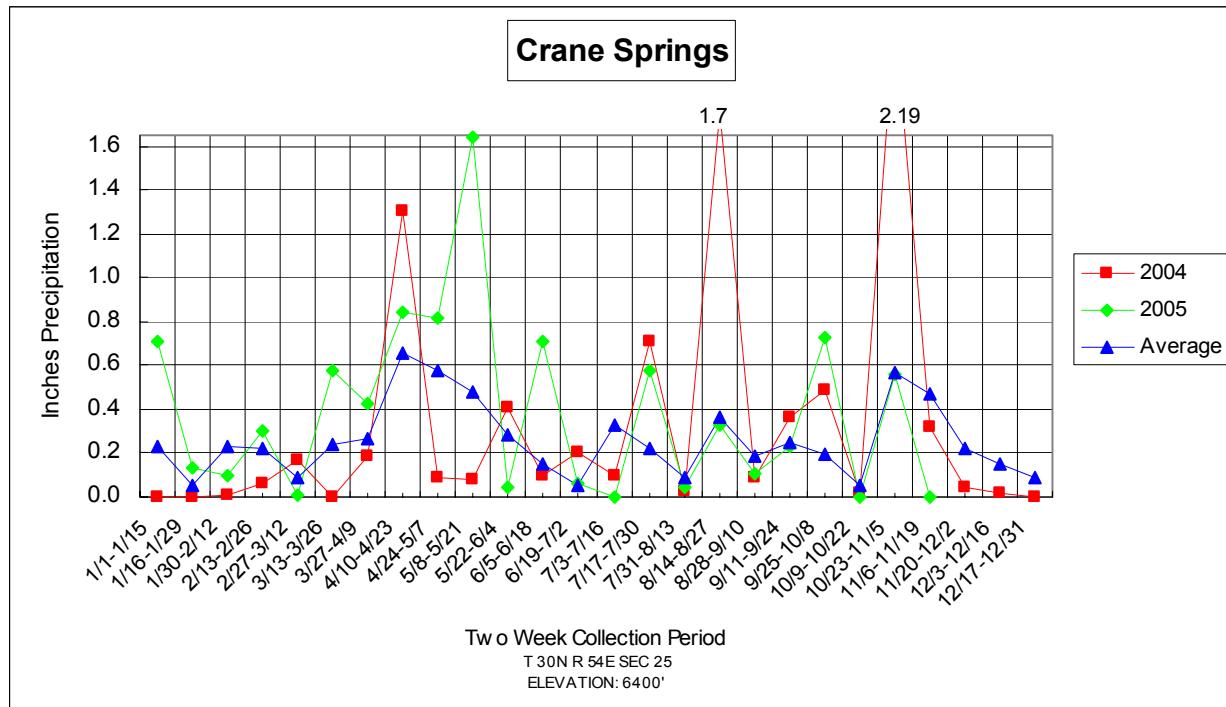


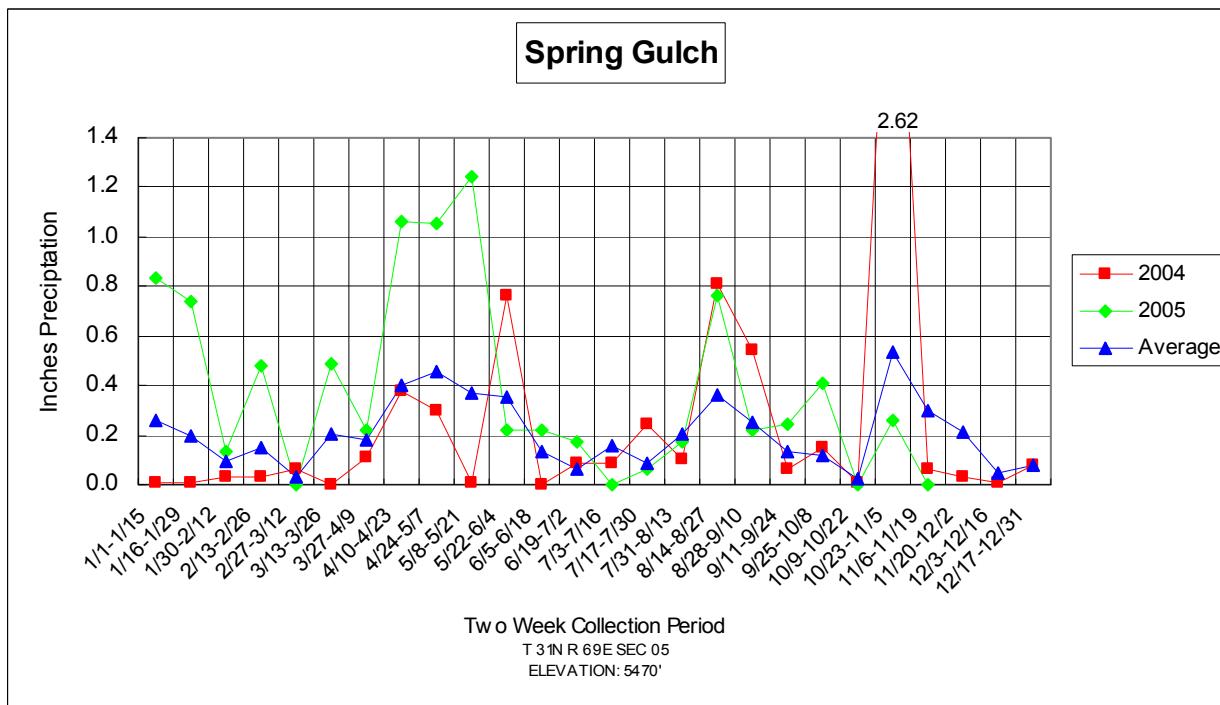
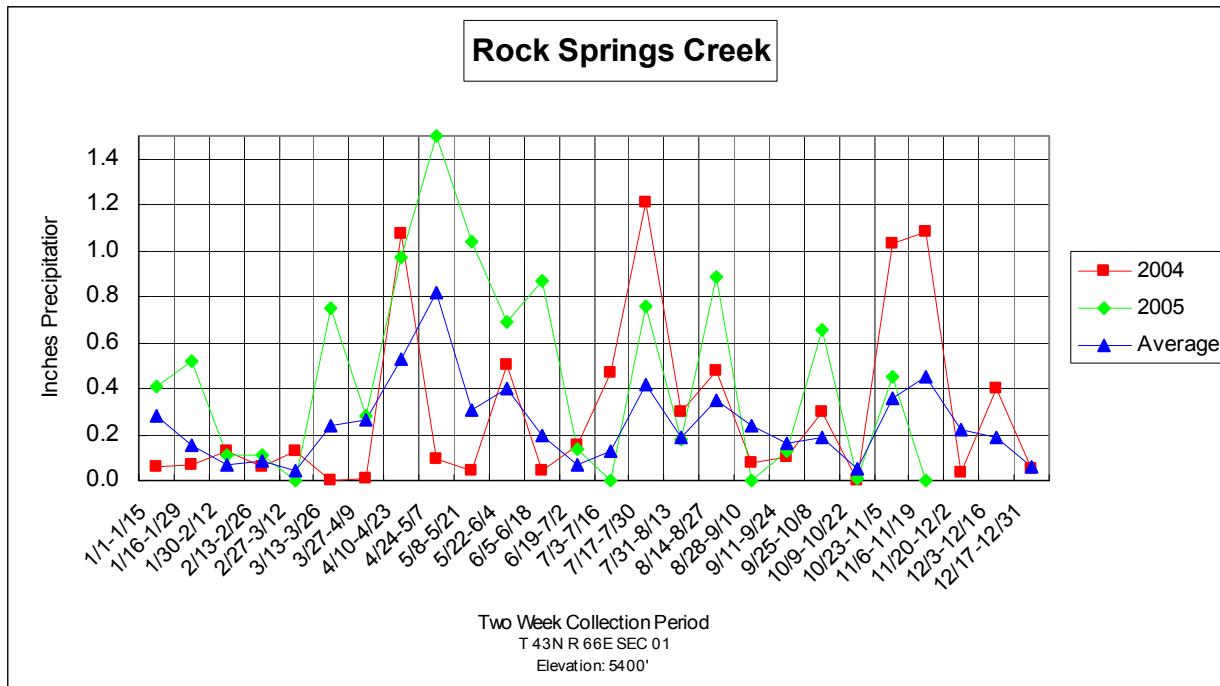


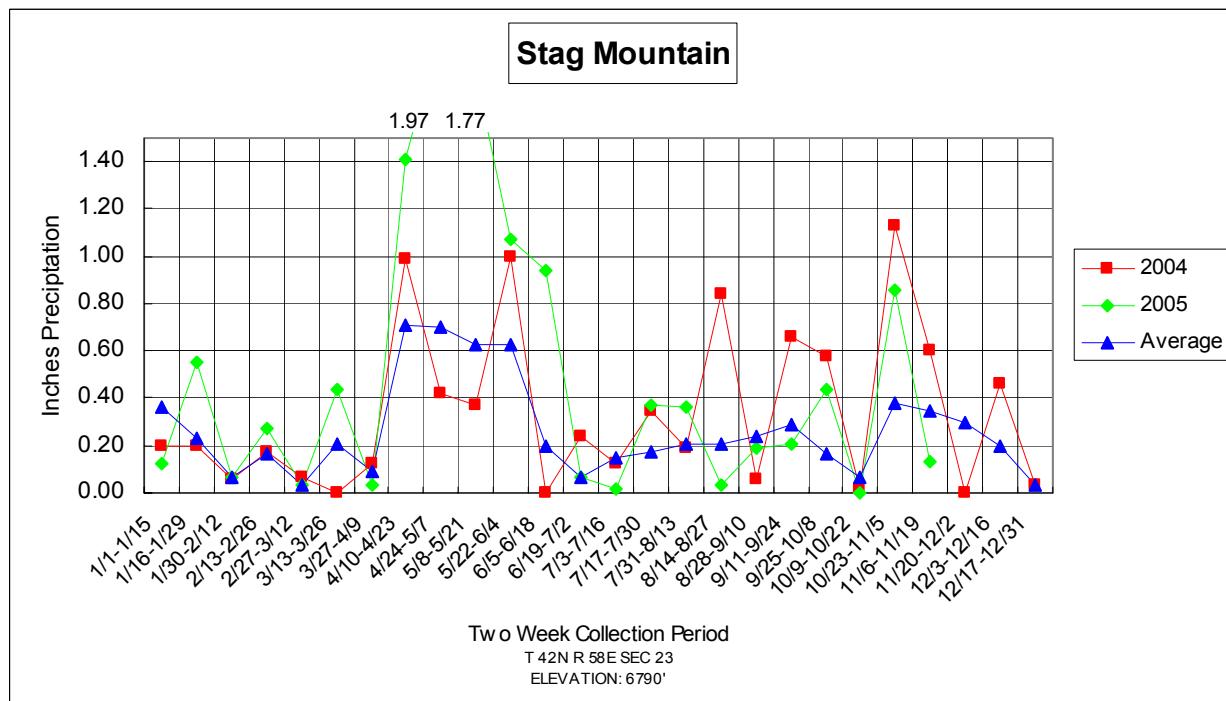
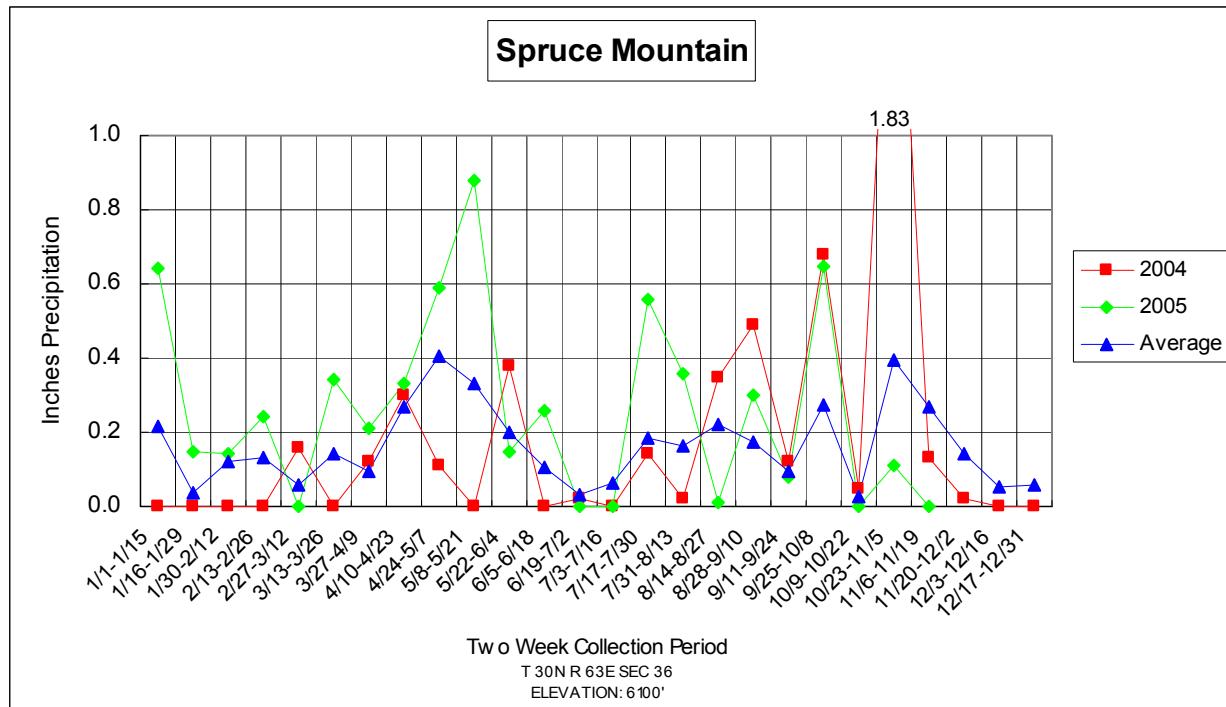


## ELKO

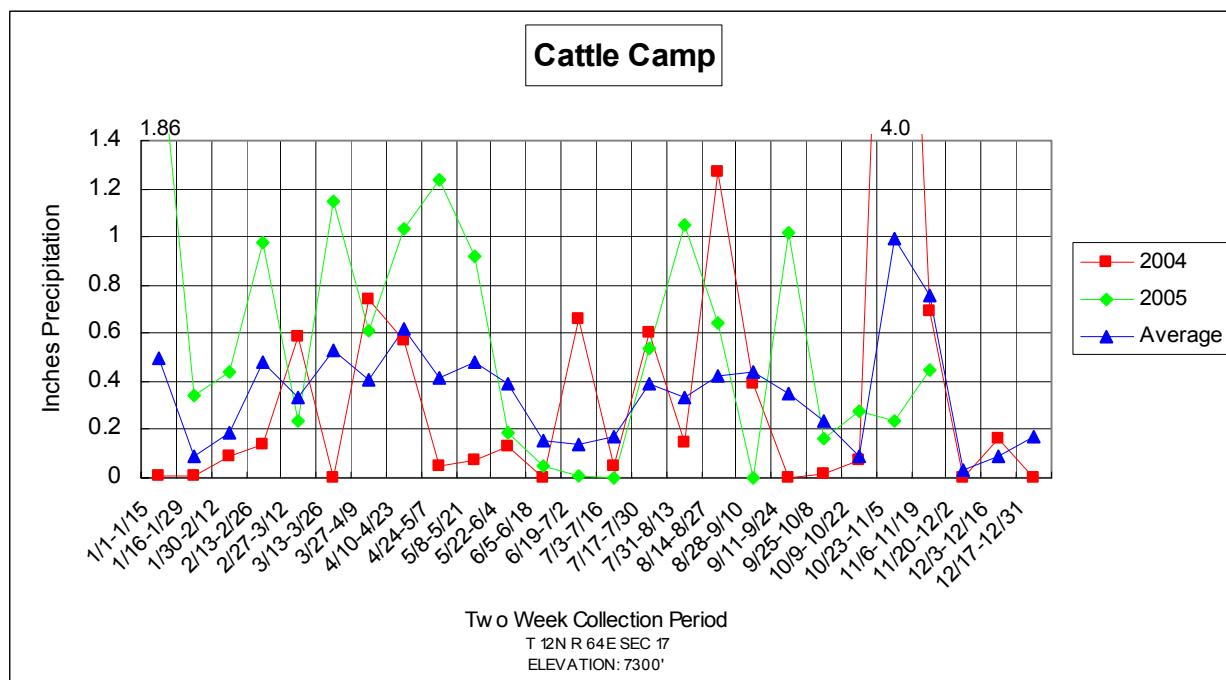
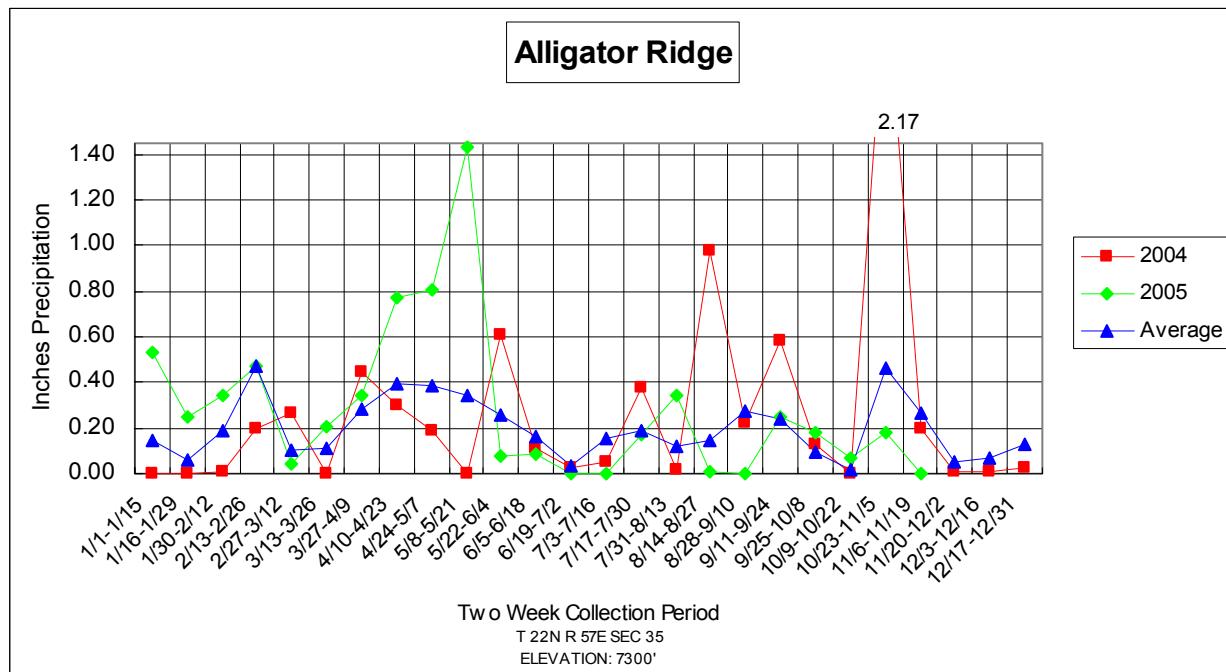


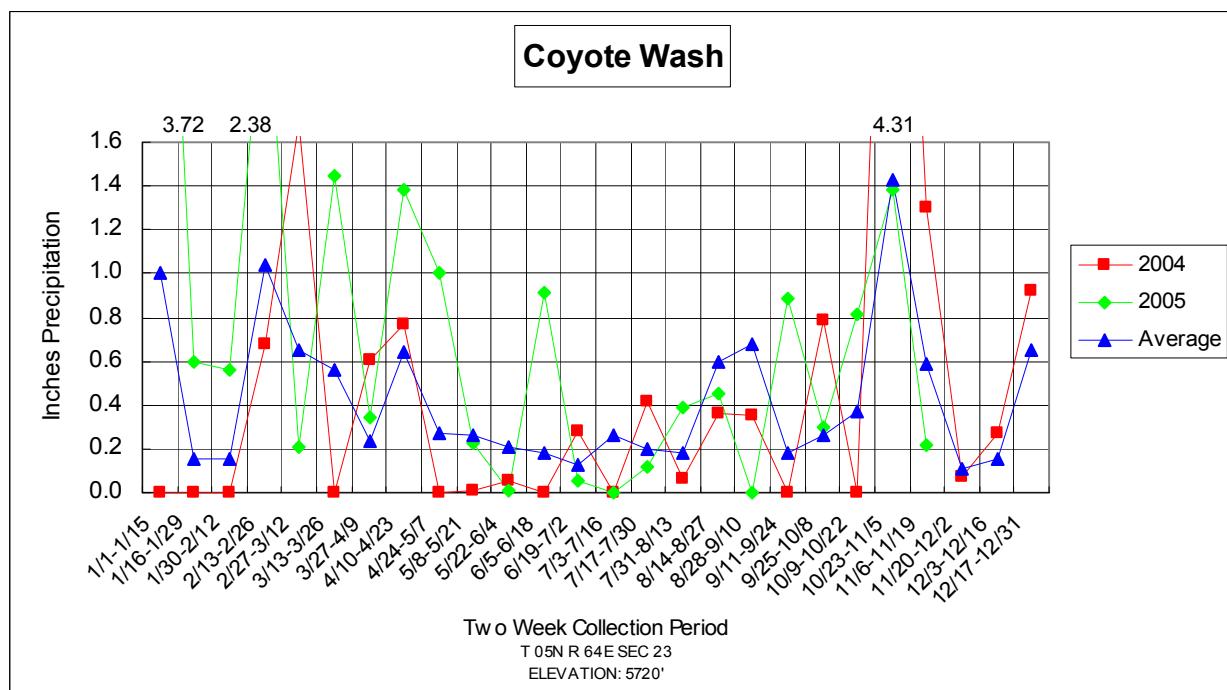
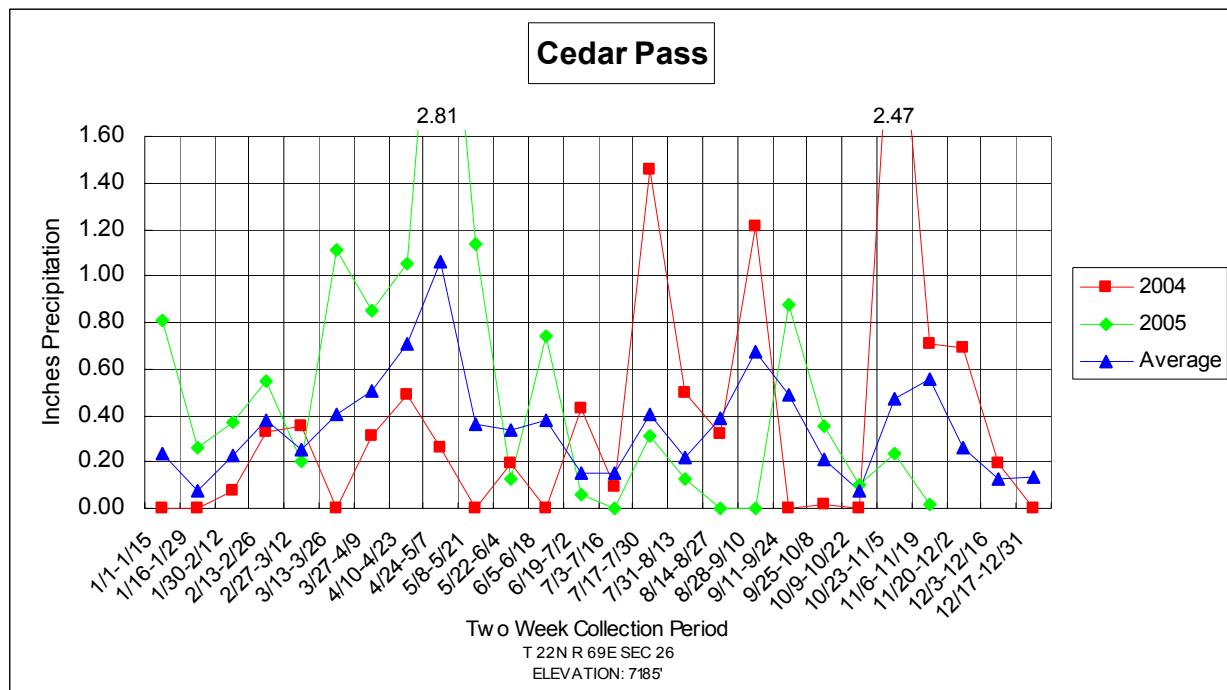


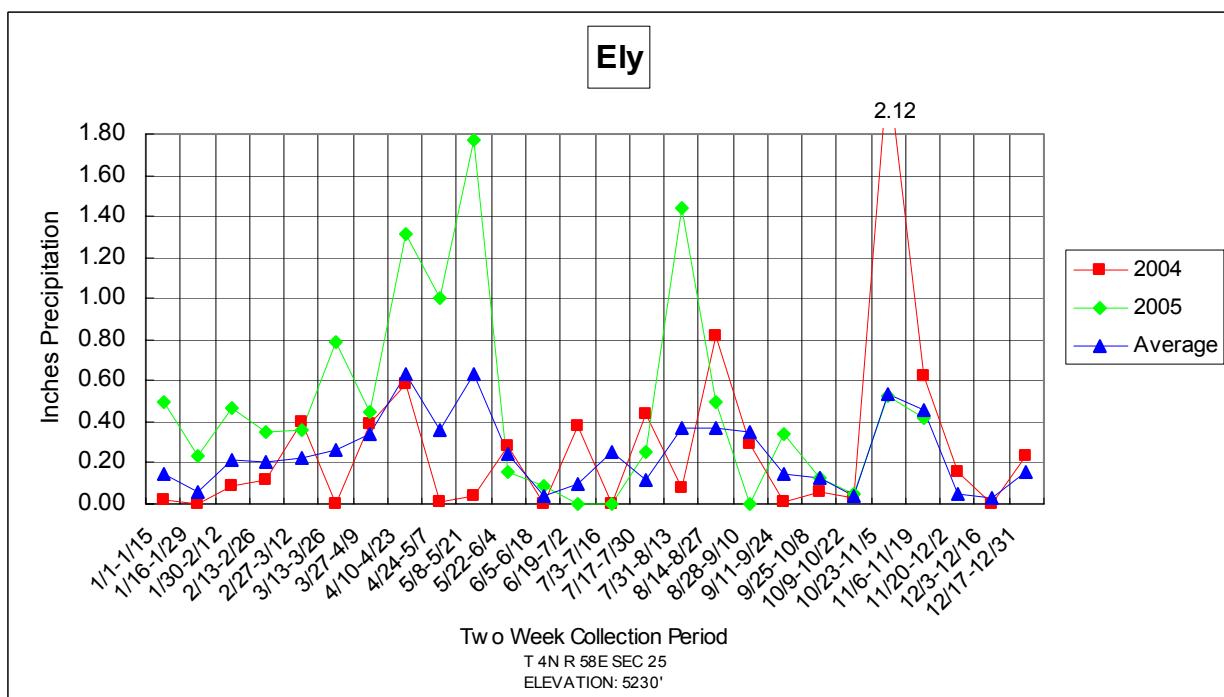
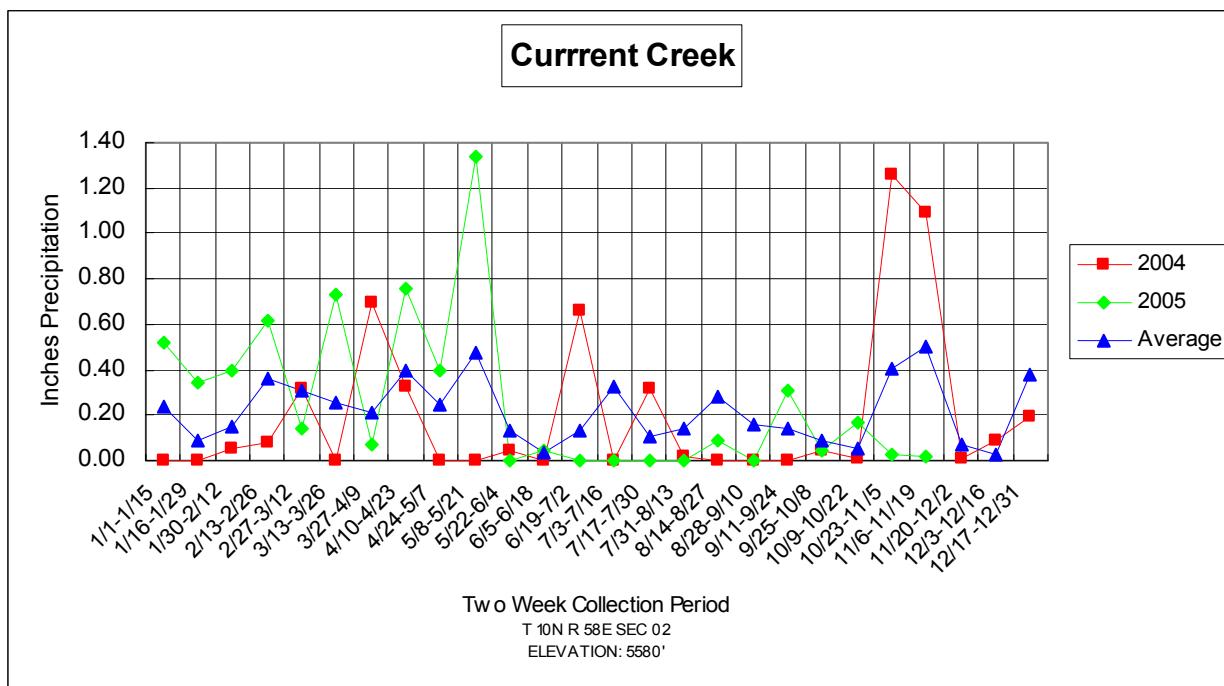


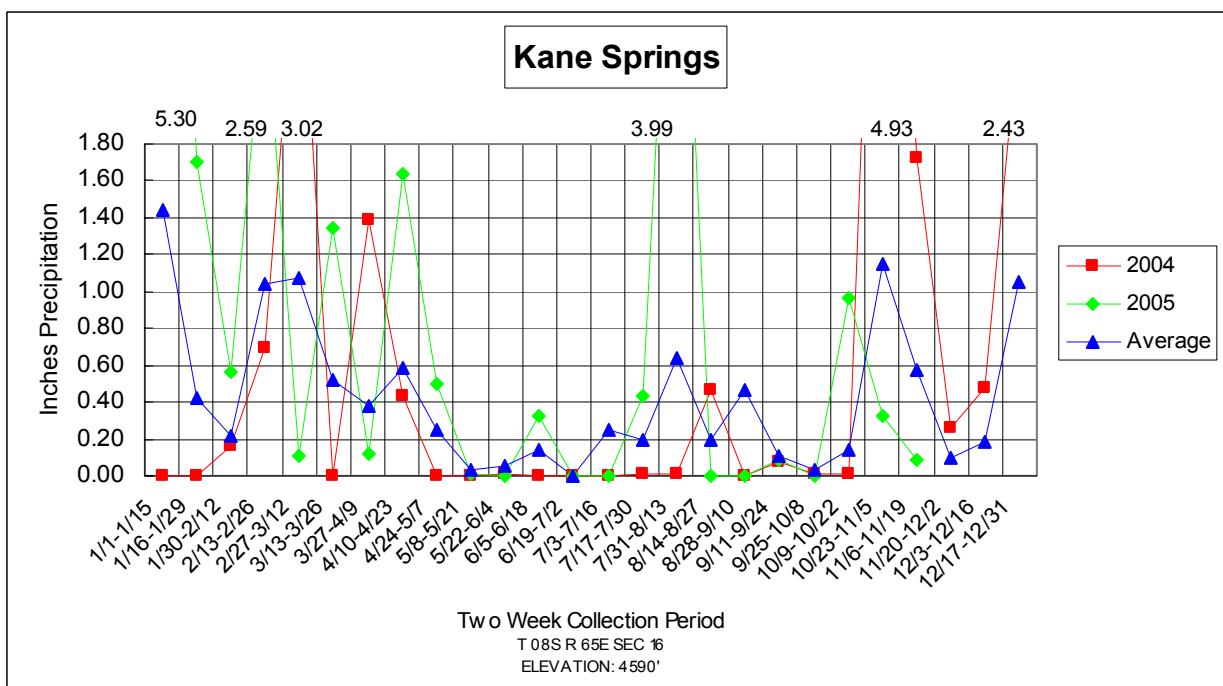
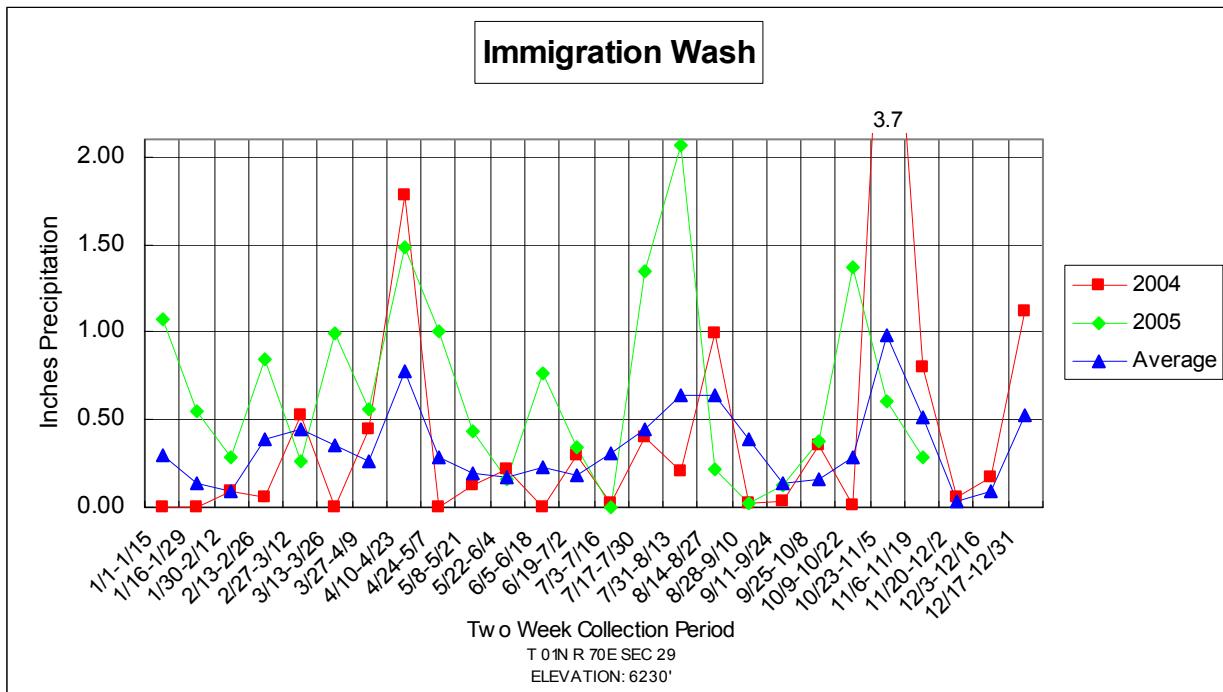


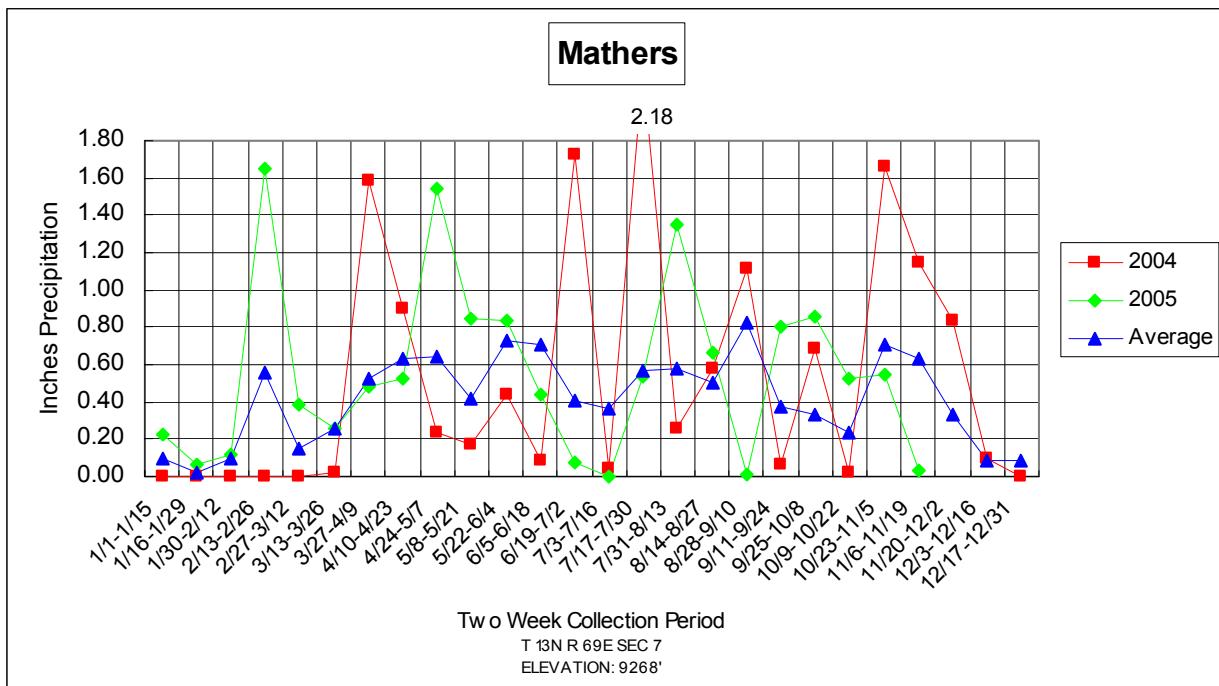
## ELY



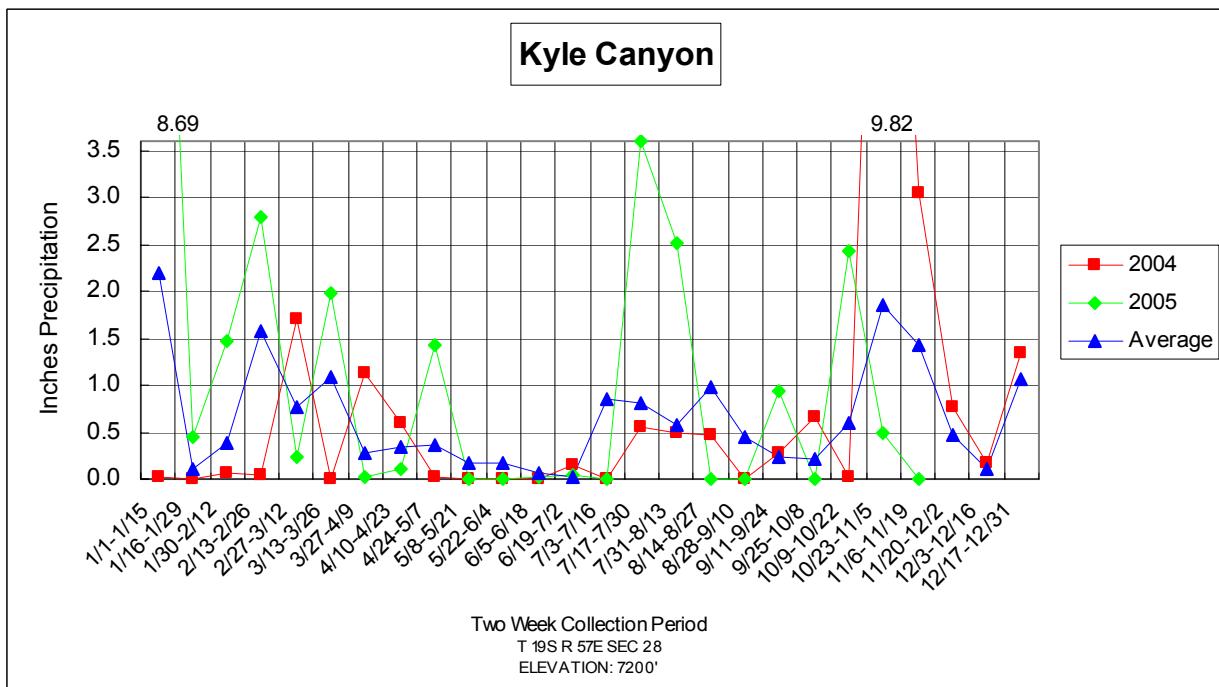


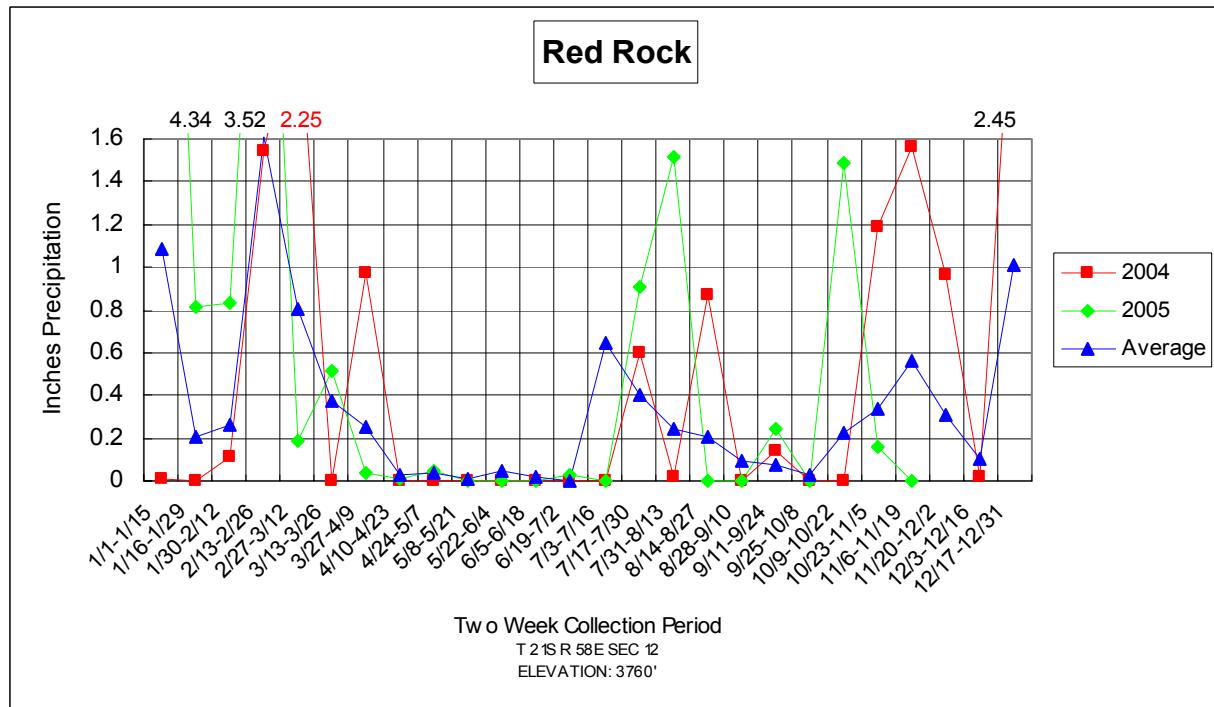
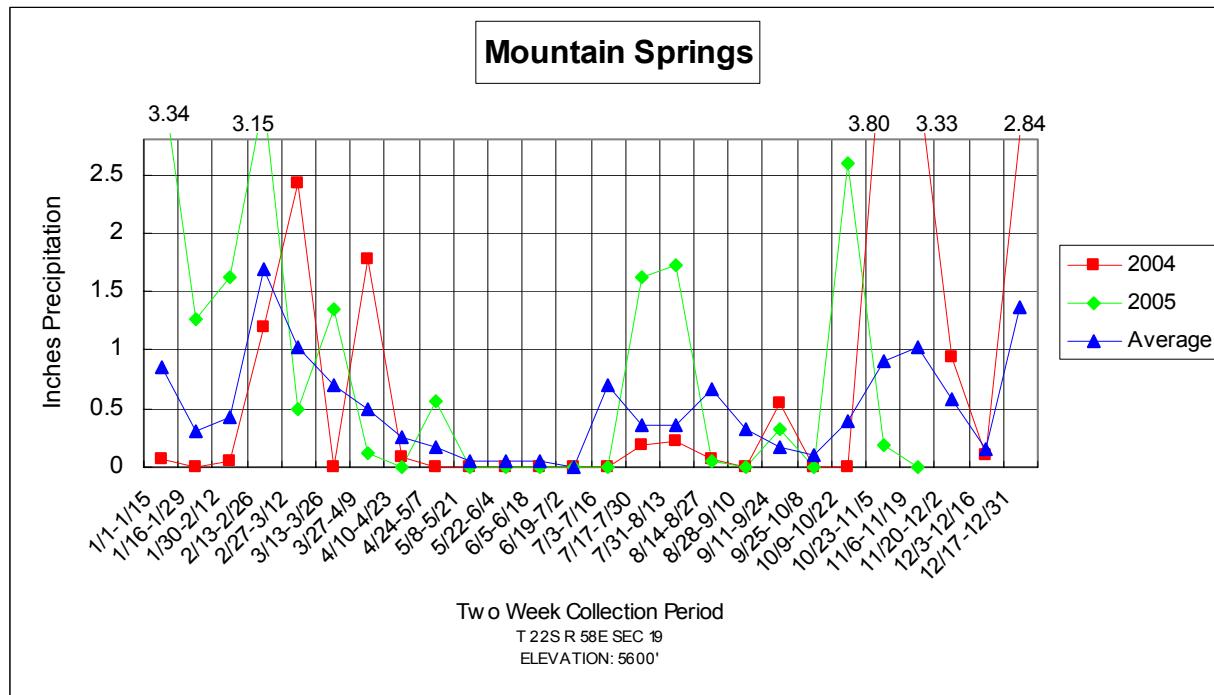




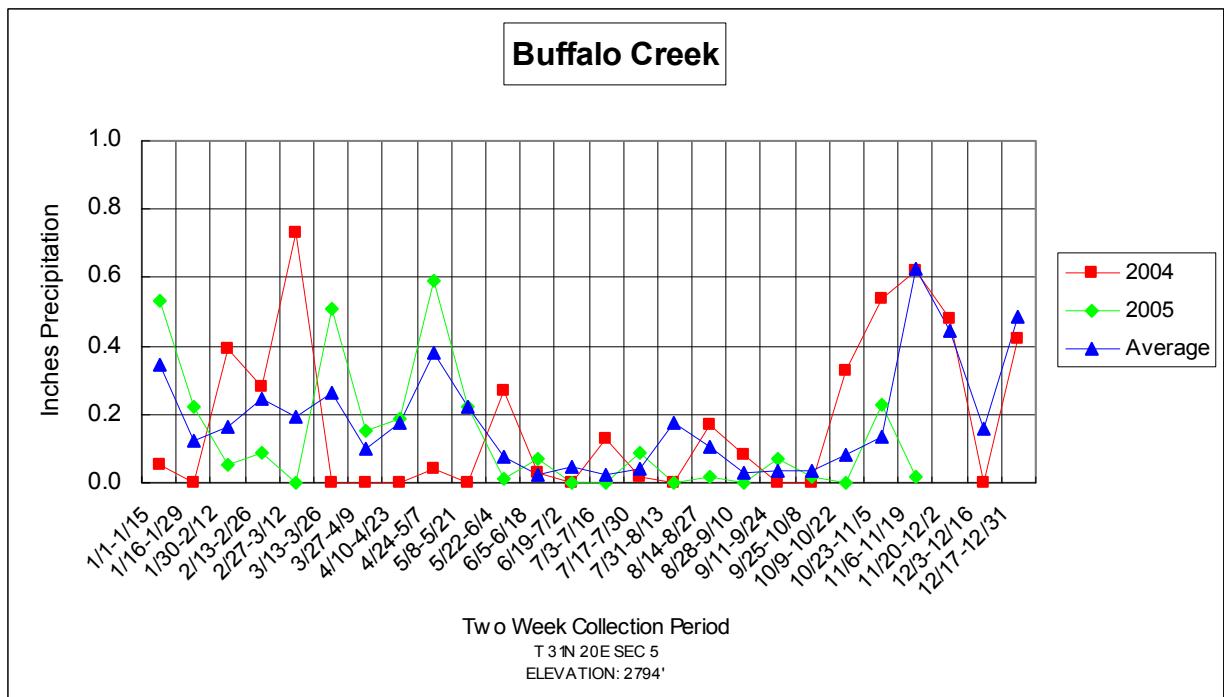
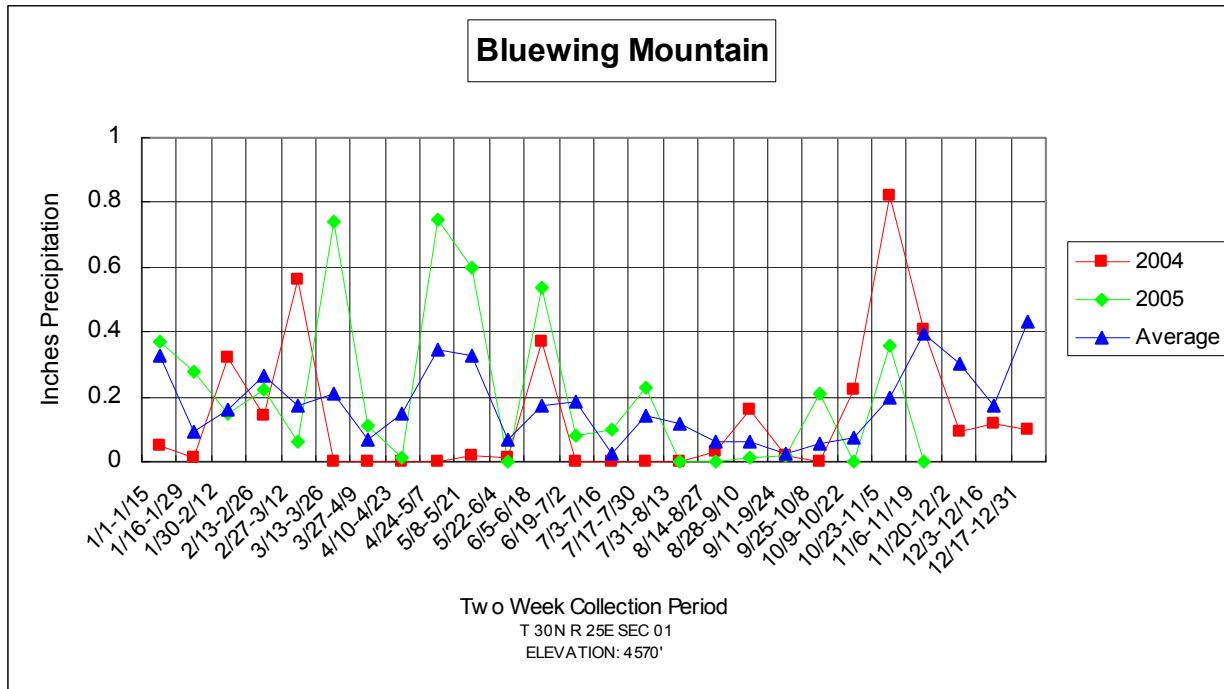


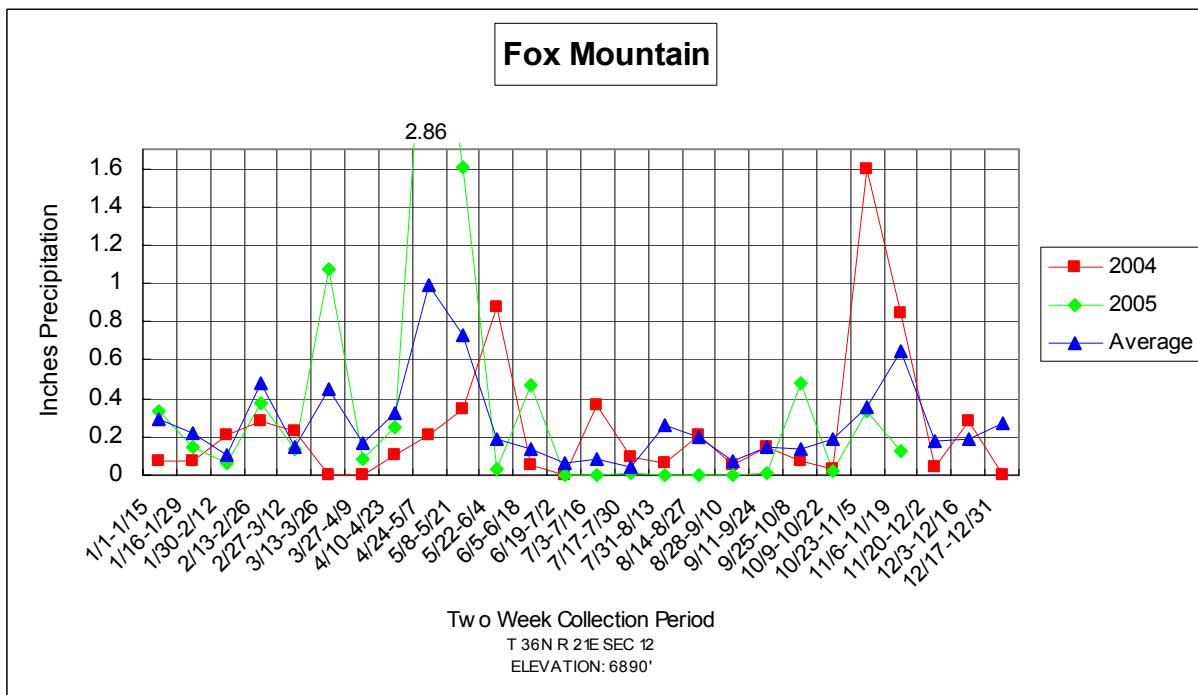
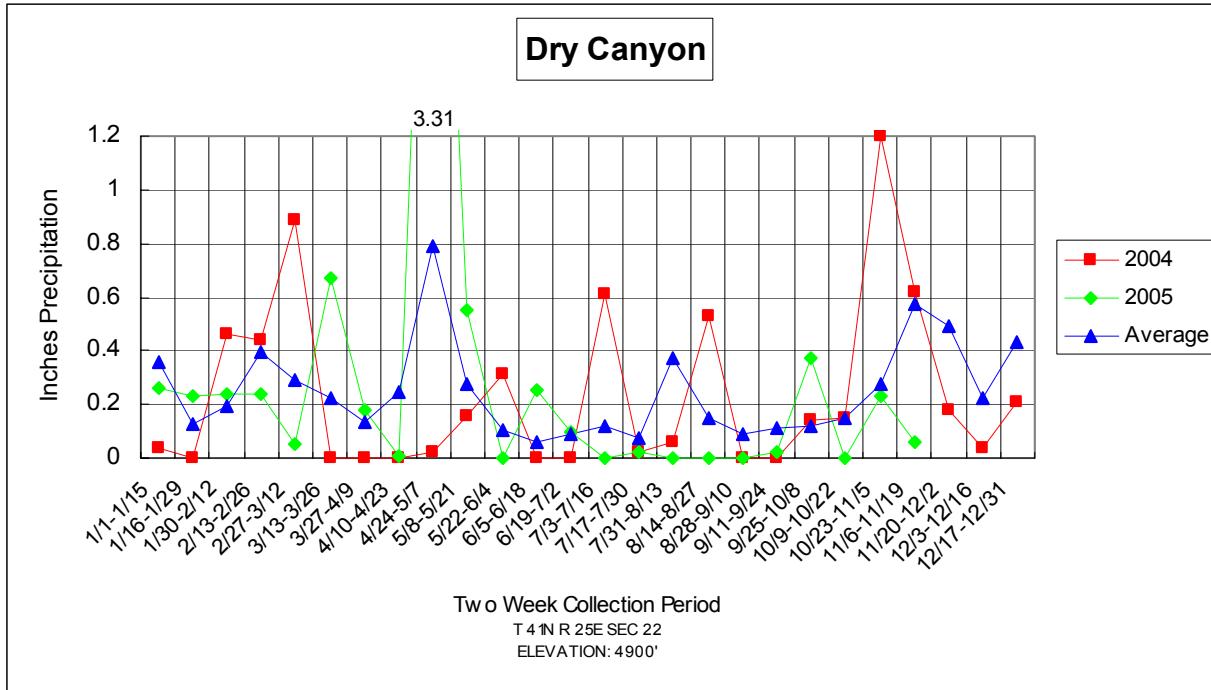
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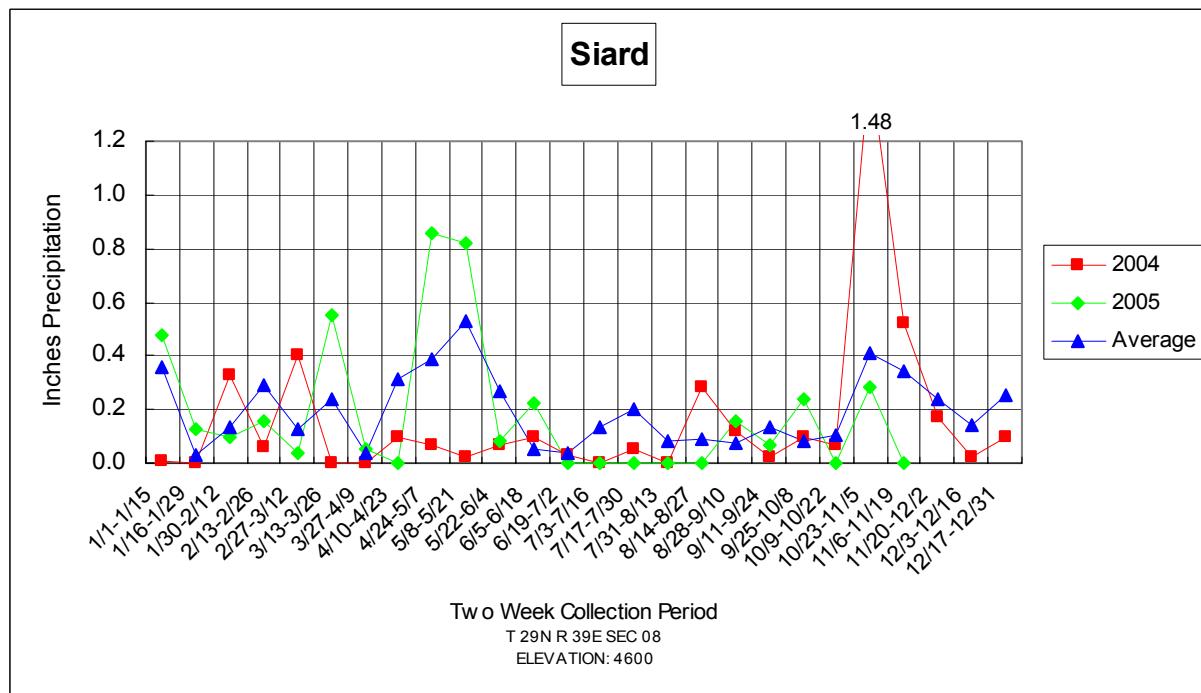
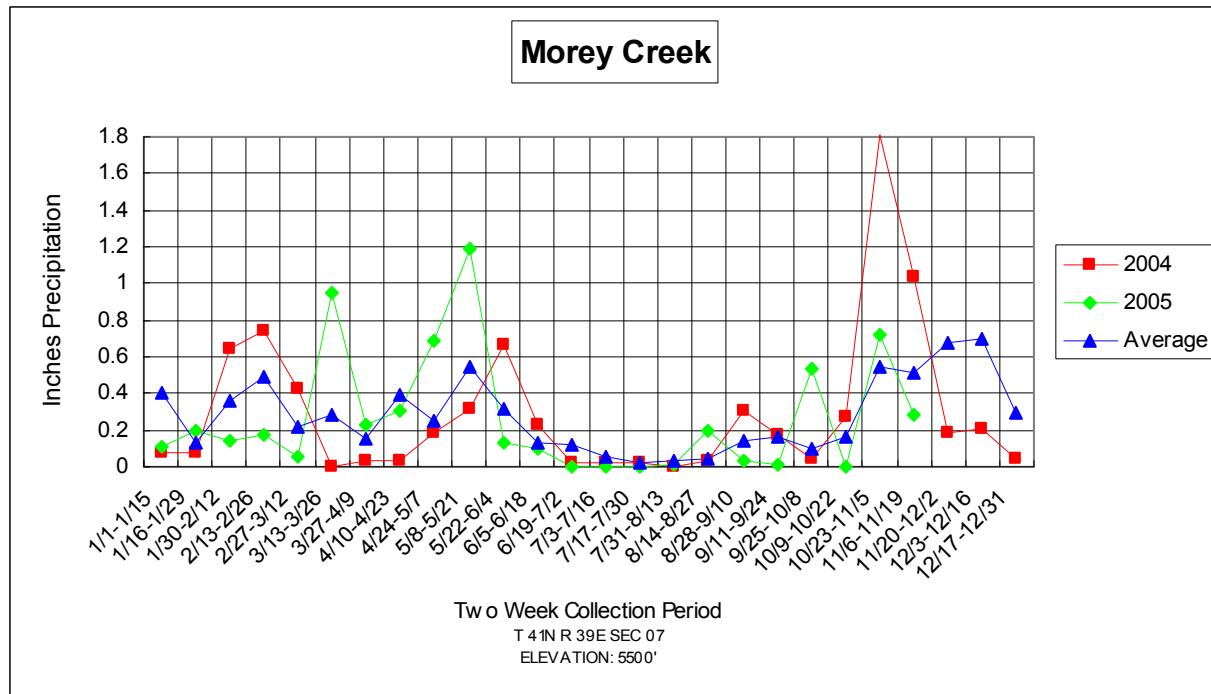


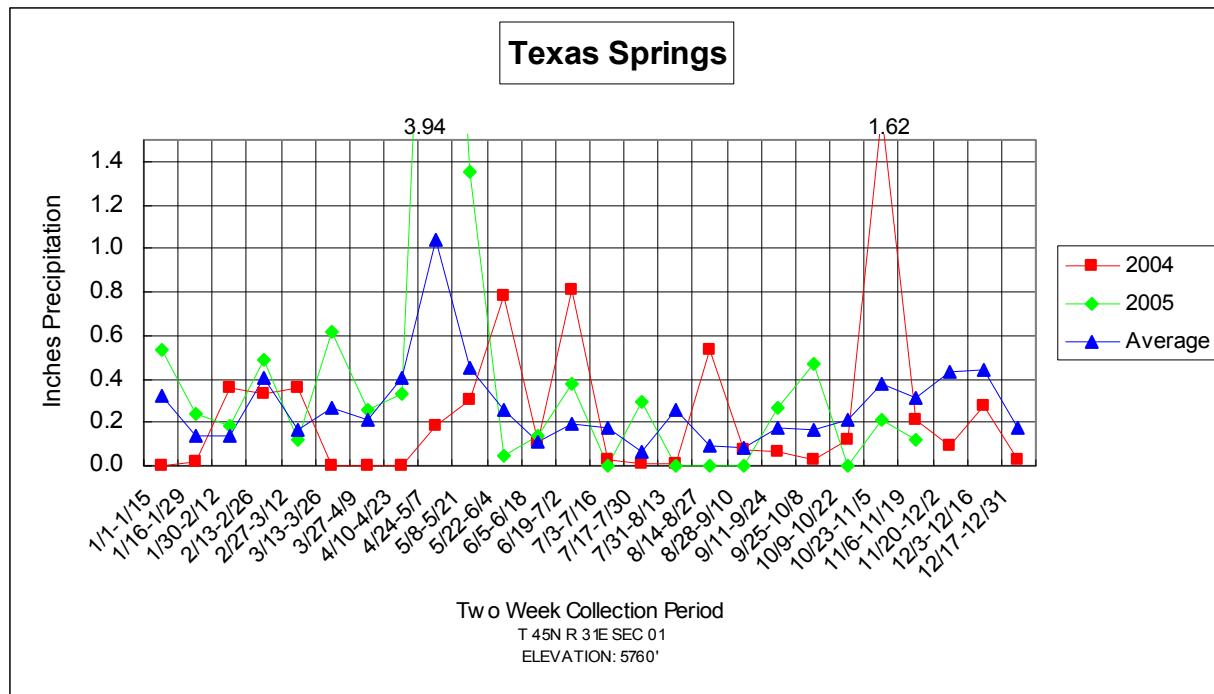


## WINNEMUCCA

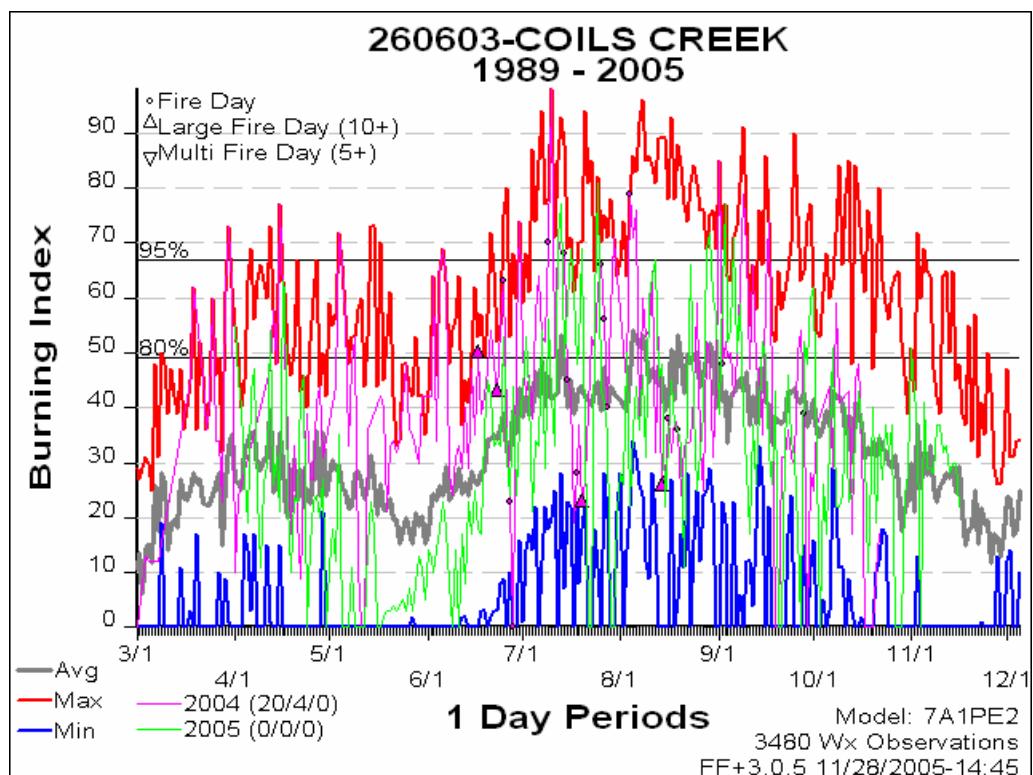
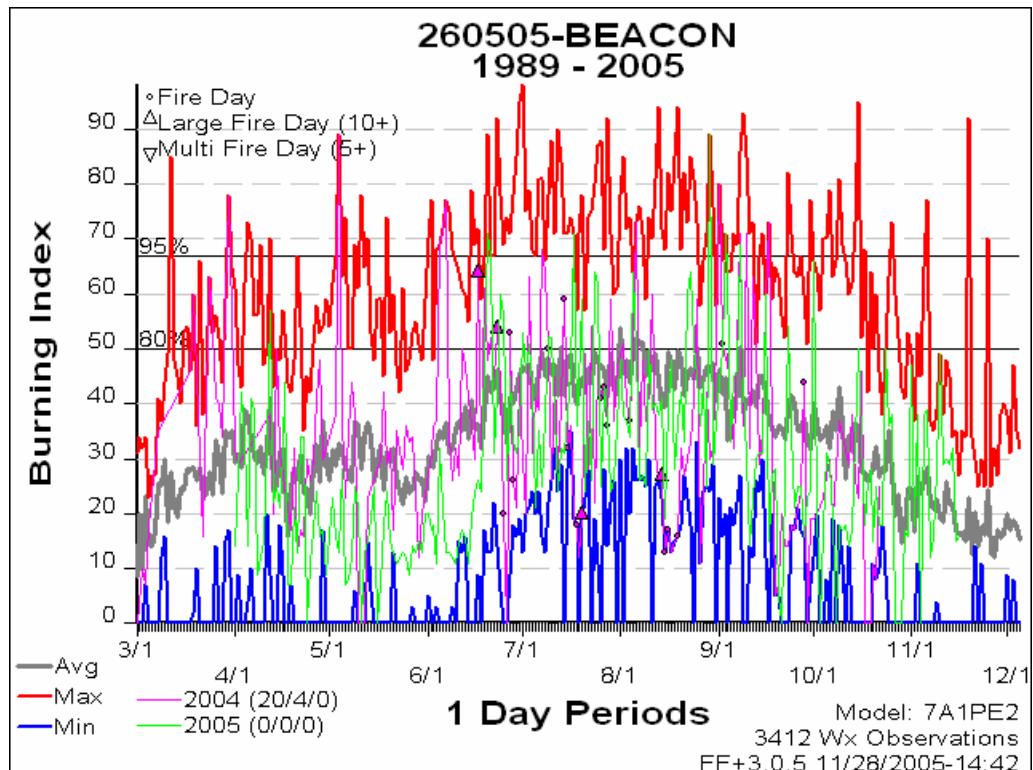


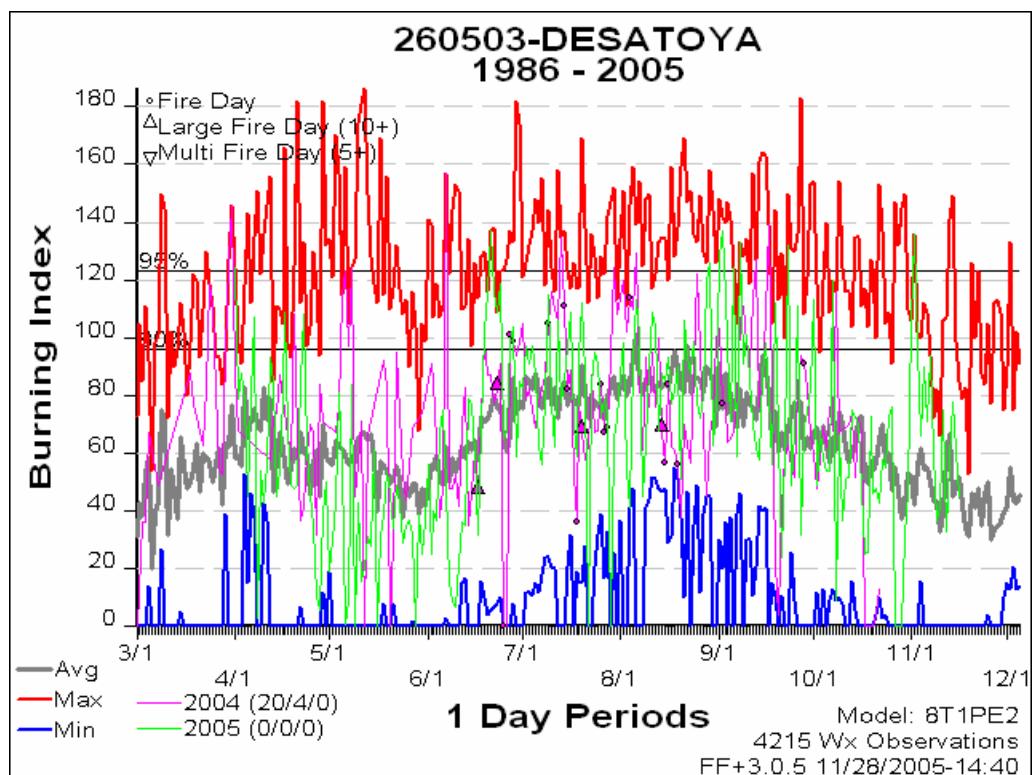




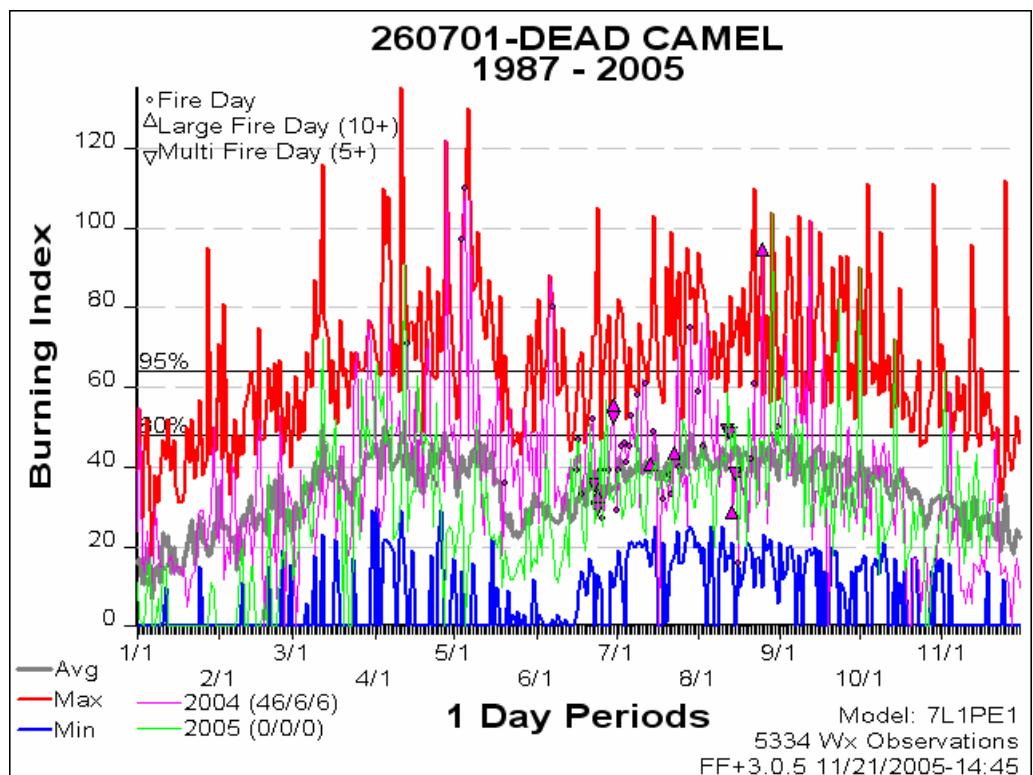


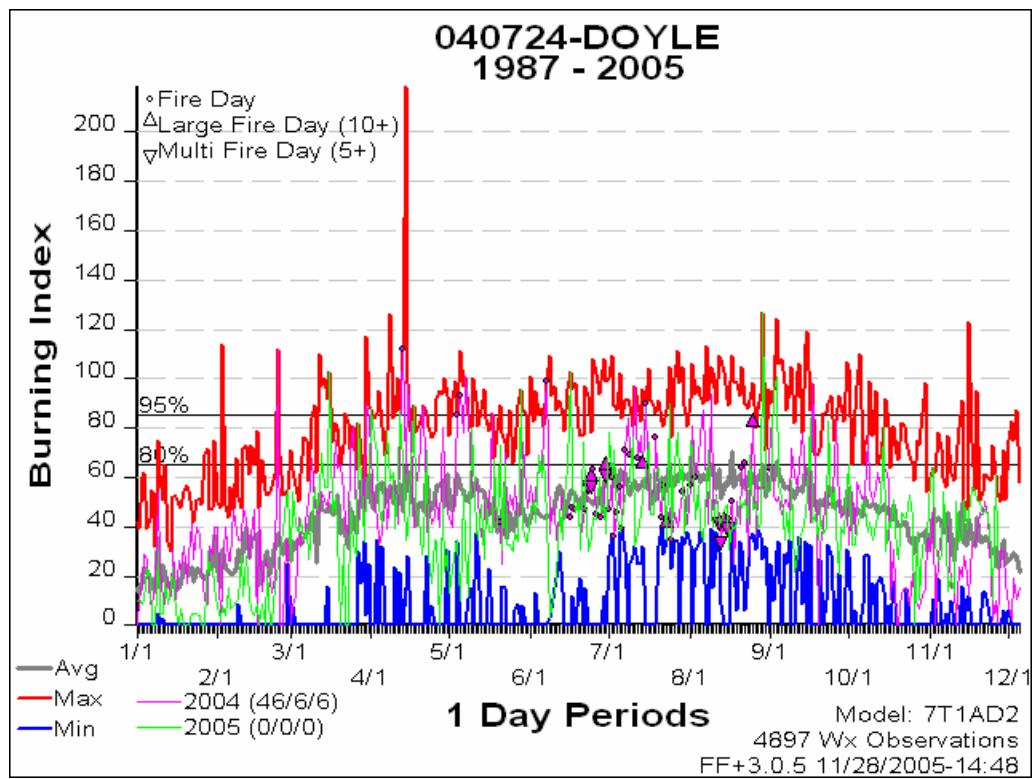
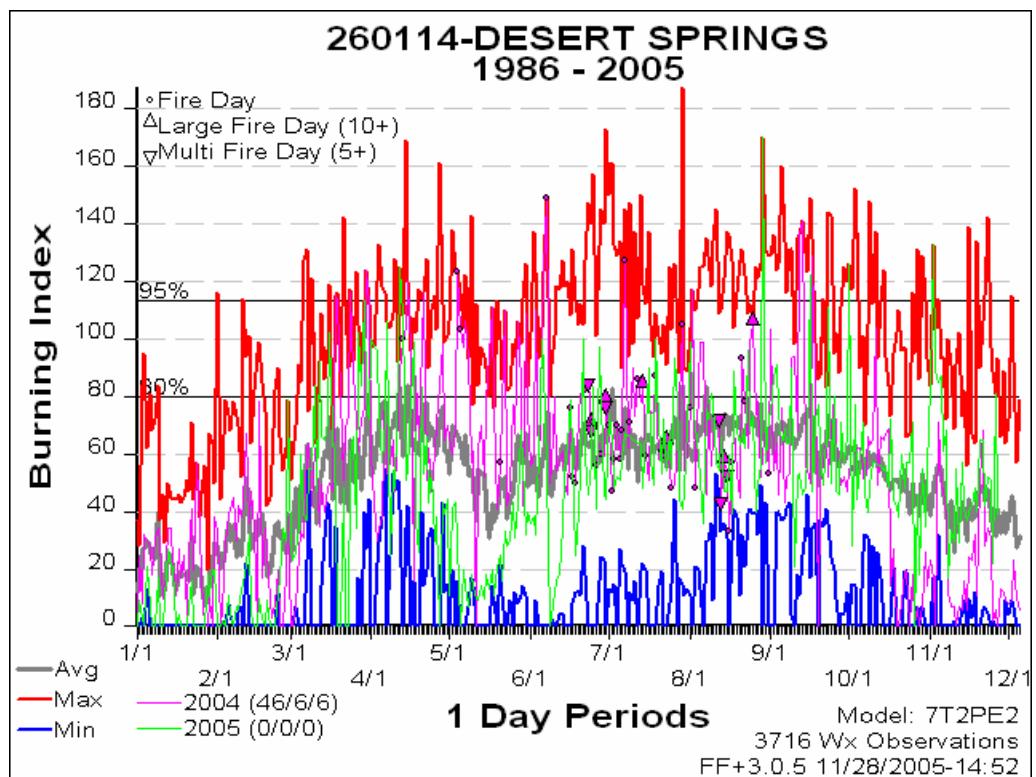
## Battle Mountain

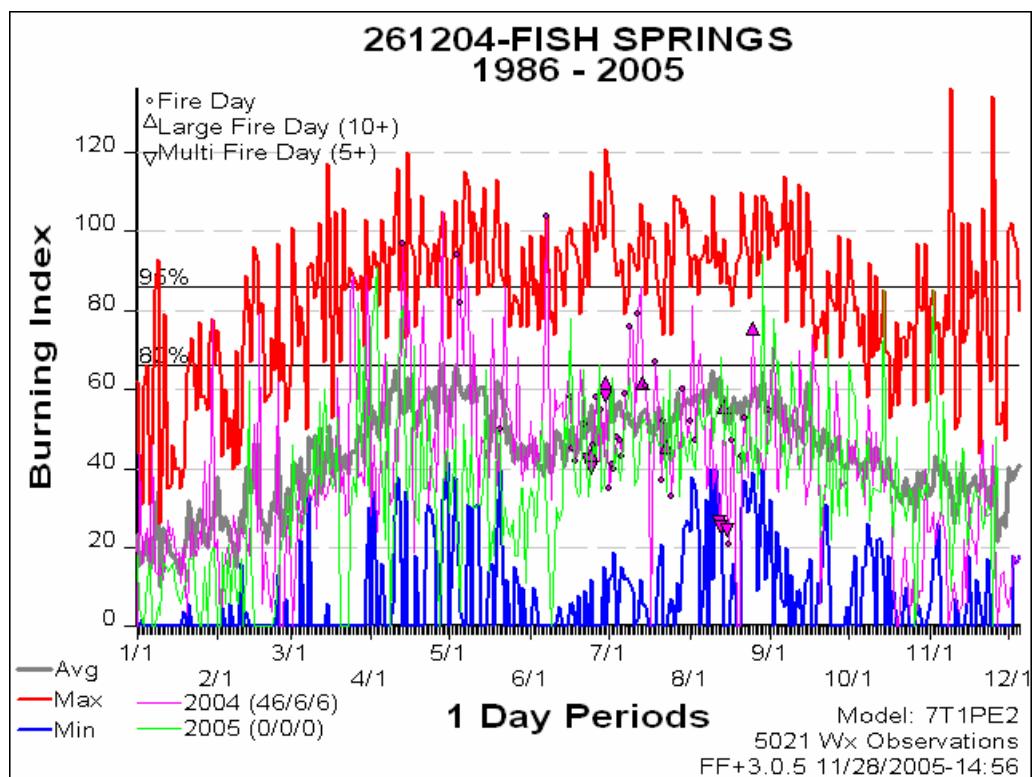




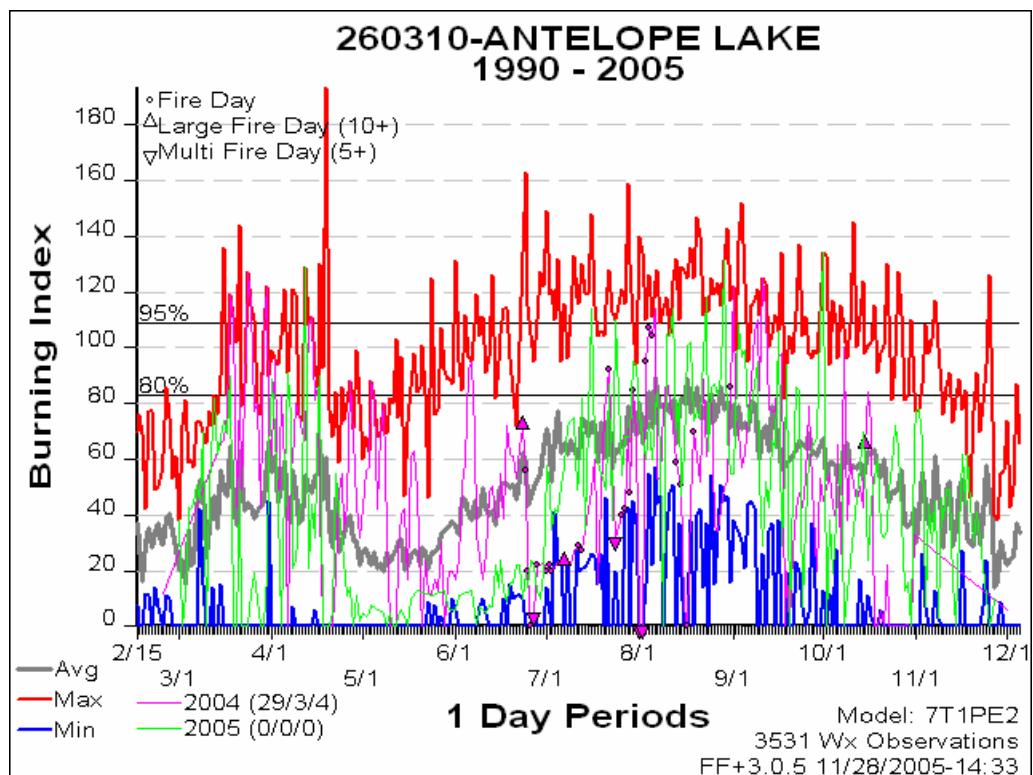
## Carson

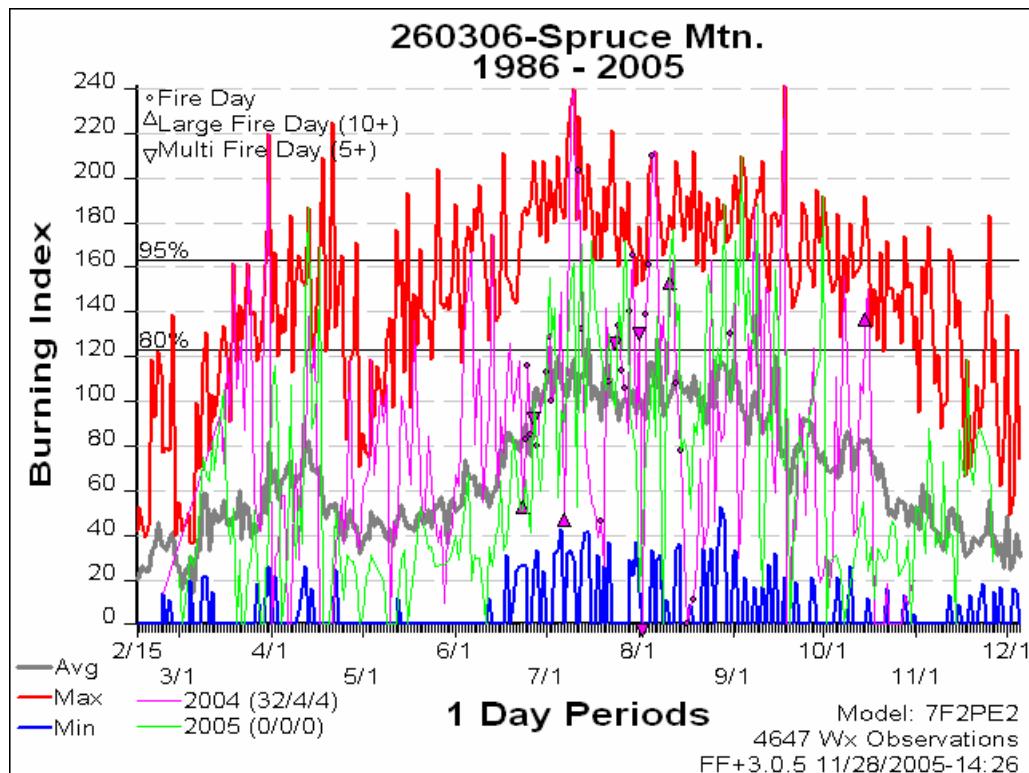
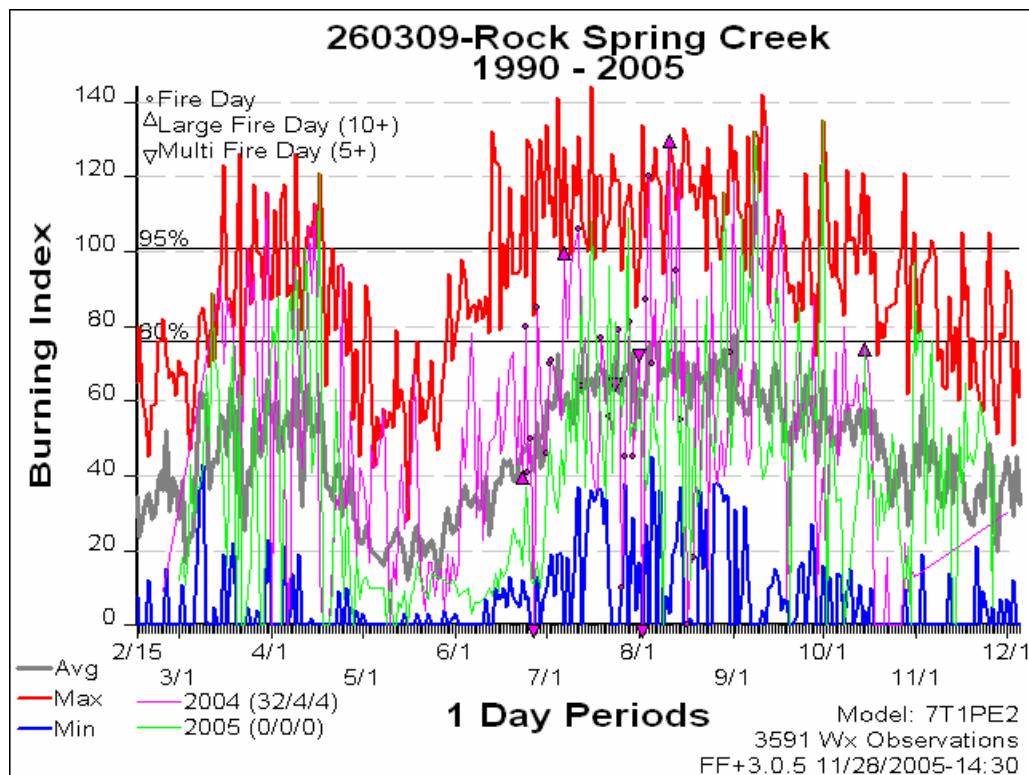




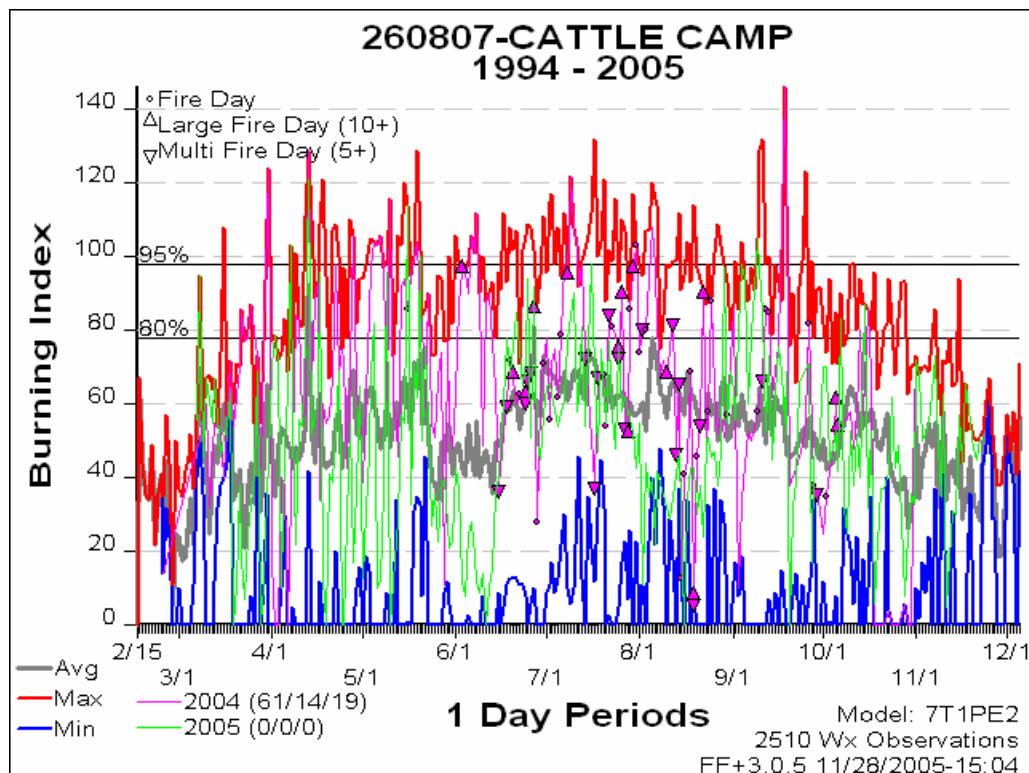
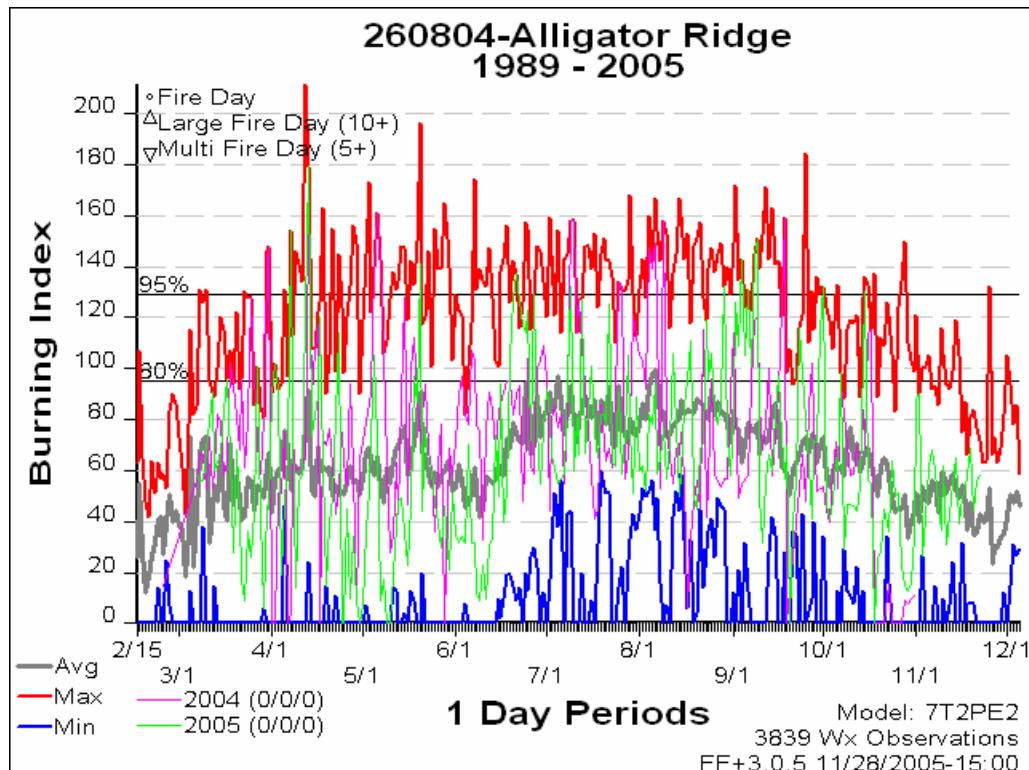


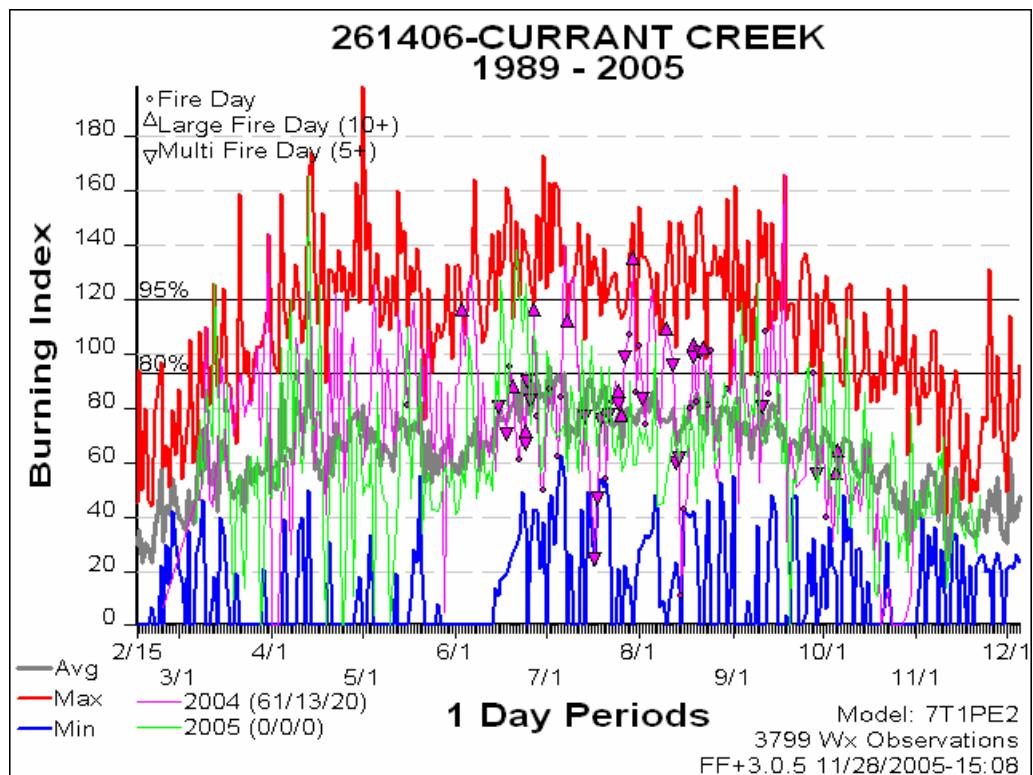
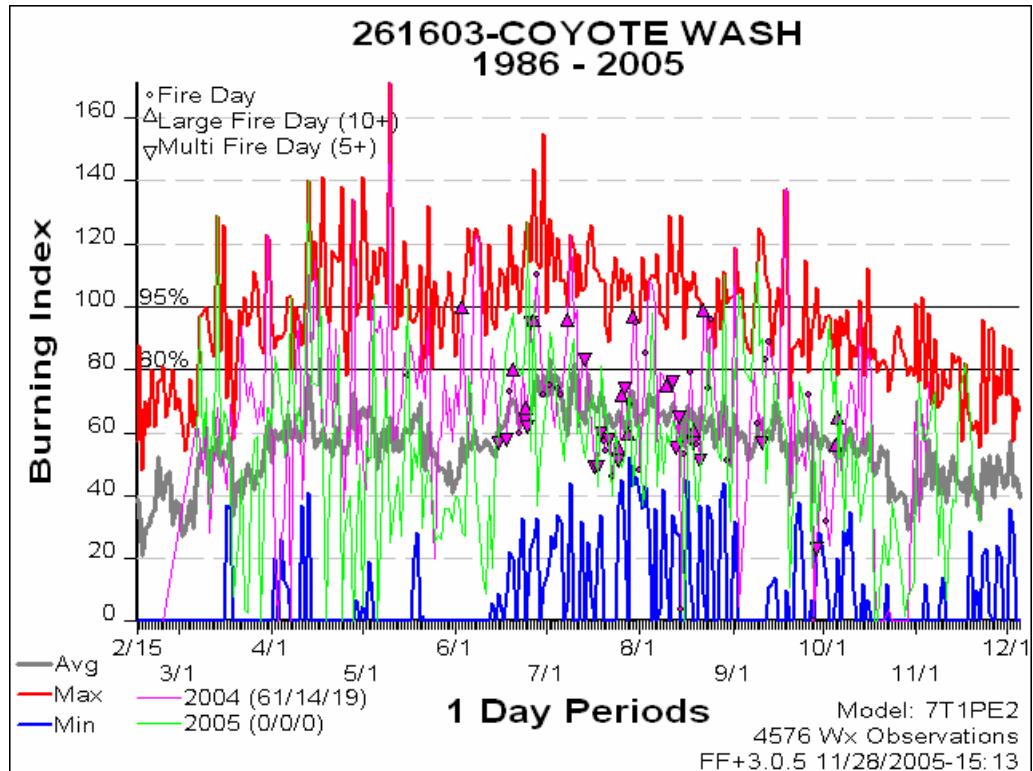
## Elko

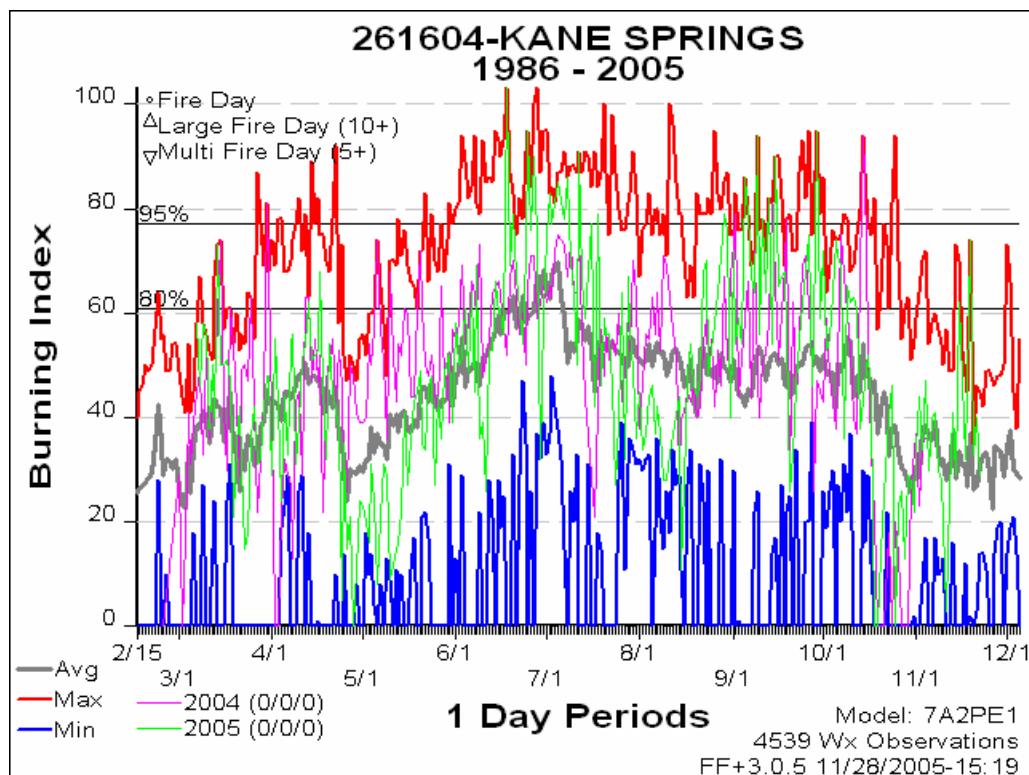
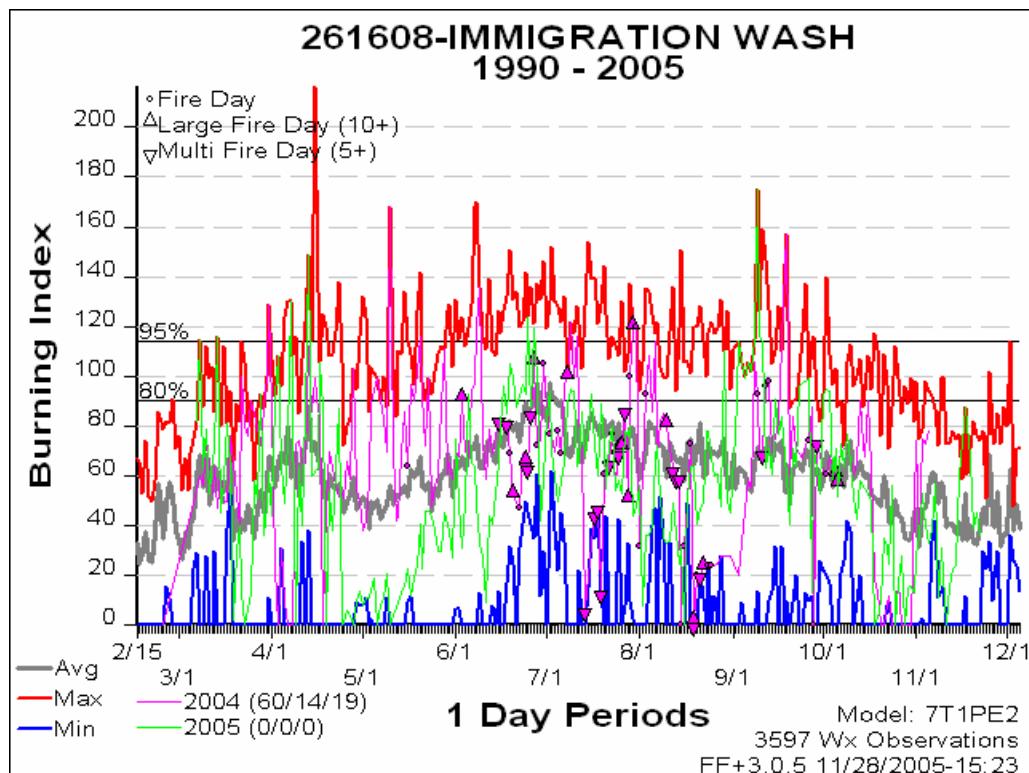




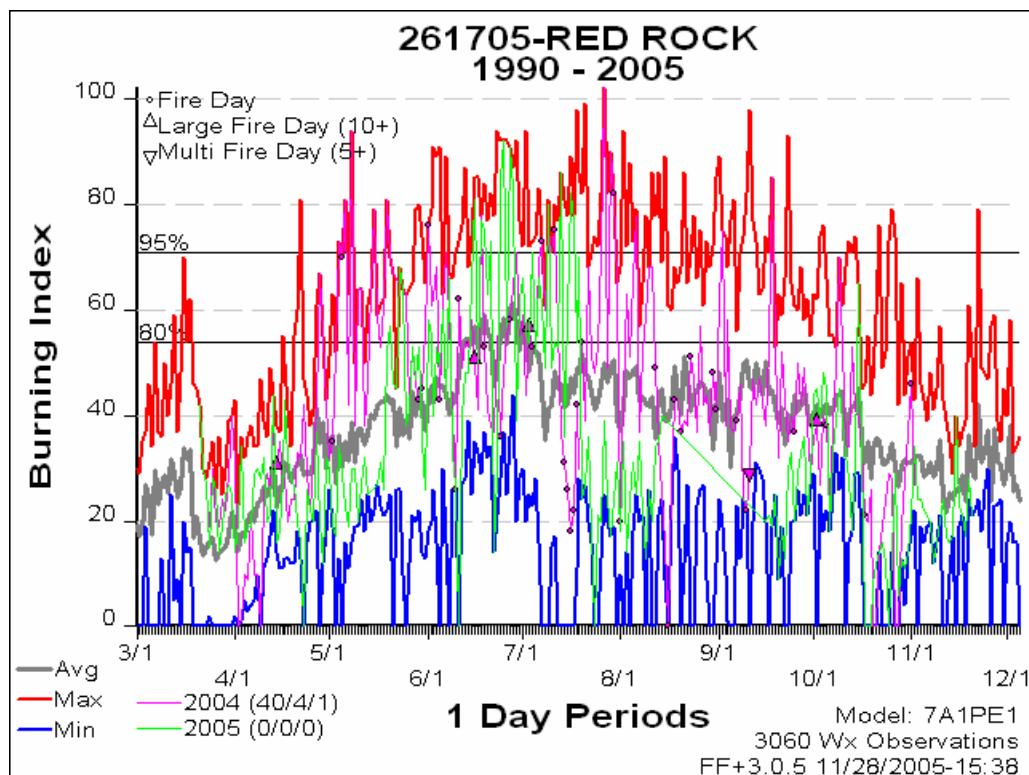
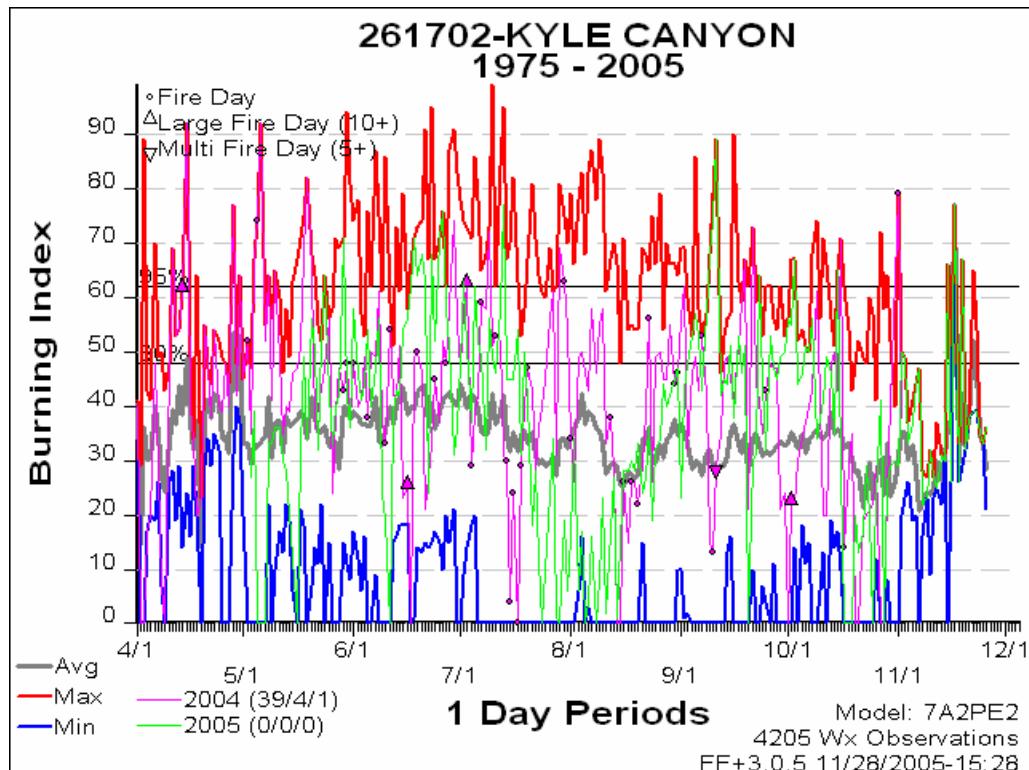
## Ely







## Las Vegas



## Winnemucca

